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METABOLISM IN DIABETES*

GRAHAM LUSK

NEW YORK

"When Bernard had completed his lectures in the winter term of 1854-55, few questions in physiology were apparently more completely settled than that of the glycogenic function of the liver. The consequences of this doctrine were of the utmost importance, for, once settled that sugar is the product of animal as well as vegetable organisms and that an organ can be found which is singly concerned in its production, we would have at once in the exaggerated performance of a normal function, the proximate cause of diabetes. There had been from the first no lack of opposition to Bernard's views, but so skilfully had he defended his position that, at the time of which we make mention the very objections of his critics had only served to increase, in the eyes of the candid, the magnitude of his triumph."

These were the opening words of an article on "The Origin of Diabetes with Some New Experiments Regarding the Glycogenic Function of the Liver," read before the Medical Society of the County of New York forty years ago by my father,[1] then professor of physiology at the Long Island Medical College. The paper controverted the stand taken by Pavy, and held by him to this day—that the conversion of glycogen into sugar is a post-mortem phenomenon. The paper showed that blood drawn by a catheter from the right heart of a resting dog which had been fed on meat was four times richer in blood-sugar than that contained in the jugular vein, and from this it was inferred that the hepatic vein was carrying sugar into the venous system. The discussion which followed the reading of the paper was opened by Dr. Austin Flint, Sr., who stated that he had two diabetic patients in whom regulation of the diet had been the only and successful treatment. Dr. Austin Flint, Jr., then described experiments he had made on the glycogenic function of the liver and gave a lucid interpretation of them.

I have made mention of this scene to illustrate how forty years ago in New York City the spirit of research was active in the lives of two young men then about thirty years old, while the older master of medicine stood by in sympathetic encouragement. It is thus that the science of medicine is developed, and that young men who subject themselves to like discipline become powerful.

In this paper of my father is noted the fact that other organs besides the liver might be involved in diabetes, and indeed in one case which he had examined the only lesion he could discover was calcareous degeneration of the pancreas.

In 1889 von Mering and Minkowski extirpated the pancreas of dogs and produced in them a so-called "total diabetes" which bears striking resemblance to human diabetes. Dogs with pancreas diabetes cannot oxidize dextrose when given; dextrose is produced from protein so that 2.8 gm. of dextrose appear in the urine for each gram of nitrogen; there is acidosis with the appearance of beta-oxybutyric acid in the urine; there is emaciation and finally death in coma. Minkowski maintains that disease of the pancreas is the cause of diabetes mellitus. Lépine's suggestion that the pancreas manufactures a ferment which, passing to the blood-stream, effects the oxidation of dextrose within the cells of the normal organism, gave a simple though by no means proved explanation of the influence of the pancreas over carbohydrate metabolism. Cohnheim's explanation that the pancreas furnishes a "kinase" or activator which influences a second glycolytic ferment, is an elaboration of Lépine's idea.

The influence on diabetes of glands other than the pancreas has recently attracted considerable attention, but the results obtained by different experimenters have been so conflicting that considerable doubt exists as to whether they have any action at all.

In work on a diabetic patient, a medical student under strict control, Arthur Mandel and I found on a meat-fat diet that 3.65 gm. of dextrose appeared in the urine for every gram of nitrogen present there, and this was a relationship which I had for many years obtained in phlorhizin-glycosuria in dogs. This relationship between the dextrose and the nitrogen in the urine, the so-called D:N ratio, is a matter of considerable importance in the modern literature of diabetes. All those present remember from their early instruction in physiology that the appearance of 1 gm. of nitrogen in the urine corresponds to a destruction of 6.25 gm. of protein in the organism. On the basis of the experiments on the diabetic medical student we can therefore establish the following equation:

6.25 gm. protein = 3.65 gm. dextrose = 1 gm. nitrogen.

In other words, protein yields nearly 60 per cent. of itself as sugar. This relationship was constant, no matter how much protein was given, and was in no way dependent on variations in the amount of fat ingested. I am fully aware that authorities for whom I have a profound respect proclaim that fat may be converted into sugar in the metabolism of the diabetic, and to such

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* Read in the joint meeting of the Section on Pharmacology and Therapeutics and the Section on Pathology and Physiology of the American Medical Association, at the Sixty-First Annual Session, at St. Louis, June, 1910.

1. Lusk, W. T.: New York Med. Jour., 1870, xi, 506; discussion on p. 563.

assertions I can only reply that I have never seen any evidence of it.

Regarding the origin of sugar from protein, it is certain that it does not arise from sugar pre-existing in the protein molecule. Protein is made up of many nitrogen-containing organic acids. When these are broken up in metabolism they yield ammonia, which unites with carbon dioxid to form ammonium carbonate and is carried by the blood to the liver and there converted into urea. Some of the organic acids which have lost their nitrogen are carried to the liver and are there converted wholly or in part into dextrose. Such an organic acid which arises from protein after this fashion is lactic acid, which when carried to the liver is synthesized to dextrose. This illustrates the principle of sugar production from protein.

Our patient, the medical student previously referred to, had no tolerance for carbohydrate. His sugar output approximated N grams in urine × 3.65 + carbohydrate ingested. That is to say, the urine of one day during which he had received a diet of meat and fat and 185 gm. carbohydrates amounted to 2,870 c.c., containing 217 gm. or 7.5 per cent. of sugar derived as follows:

17.8 gm. N × 3.65 gm. = 65 gm. dextrose from protein + 152 gm. extra dextrose.

And then two days later on a diet of meat and fat and only 5.5 gm. of carbohydrate, the urine amounted to 2,275 c.c., containing 92.6 gm. or 4 per cent. of dextrose derived as follows:

24 gm. N × 3.65 = 87.6 gm. dextrose from protein + 5 gm. extra dextrose.

The condition of the patient was the same on both of these days and yet how different the quantity of dextrose voided, and how different the percentage of sugar!

The figures show how utterly fallacious is the customary habit of the clinician in estimating the intensity of diabetes in accordance with the percentage of sugar contained in a twenty-four-hour sample of urine. And yet my own students, who should know better talk to me about a "2-per-cent. urine," and then suddenly realizing the situation look at me with a sheepish countenance. There are others who draw conclusions of disturbed protein metabolism from a knowledge of the number of grains of urea in an ounce of urine, without realizing that this is of no more importance than a knowledge of the number of ten-penny nails to the ounce of nails.

No, the intensity of diabetes should not be determined by the percentage of sugar in the urine, but by the relationship between the in-go of sugar plus the possible maximum of sugar production from protein as compared with the total output of sugar. This may be illustrated in the following formula modified from that given by Falta.[2]

$$\frac{\text{Output of dextrose}}{\text{Urine N} \times 3.65 + \text{food-dextrose}}$$

This multiplied by 100 gives Falta's "coefficient of excretion," or the per cent. of sugar eliminated.

In other words, recognition must be given to the fact that the output of dextrose is dependent on the amount of carbohydrate ingested and also on the height of the protein metabolism.

In diabetes the protein metabolism is higher than under normal conditions. This is because the oxidation of carbohydrates normally reduces the quantity of protein metabolized in the body. This is generally recognized as a fundamental fact of nutrition. The recent literature has contained examples of nitrogen equilibrium maintained on diets containing only 8 and 10 gm. of nitrogen, and such a low protein diet has found its advocates.

It may well be that 10 gm. of protein in the diet of an already emaciated diabetic may be sufficient to maintain him in nitrogen equilibrium in the reduced protein condition in which he finds himself, but this does not by any means invalidate the general principle that the diabetic organism cut off from the ability to oxidize carbohydrates requires more protein food than the normal organism.

There is a second phase of disturbance in the metabolism of the diabetic, and this is an imperfect oxidation of fat. Theoretically each fatty acid contained in fat and some of the oxy-acids produced when protein breaks up may yield a molecule of beta-oxybutyric acid. The diabetic organism thrown as it is on its fat-burning ability to support its life may find its capacity in this direction also curtailed. Under these circumstances beta-oxybutyric acid, acetone and aceto-acetic acid appear in the urine. This is the cause of diabetic acidosis. The urine runs high in ammonia, withdrawn to neutralize the acids formed. Alkali may also be taken from the body for the same purpose. It was Friedrich Müller who first drew attention to the fact that the percentage of ammonia in the urine had little significance, whereas the number of grams eliminated daily was an approximate measure of the intensity of the acidosis. He stated that the normal elimination of ammonia varied between 0.3 to 1.0 gm., but in diabetes reached 2, 6 and even 12 gm. in twenty-four hours. Klein and Moritz[3] have recently shown that ammonia and fixed alkali normally serve one and the same purpose, i. e., the neutralization of acids which are being eliminated. These acids are organic acids and inorganic phosphates. They find that large amounts of sodium bicarbonate given to normal persons may reduce the quantity of ammonia in the urine to almost nothing. Such a urine, while alkaline to litmus, is acid to phenolphthalein, the excess of alkali appearing as sodium bicarbonate and as secondary phosphate. They also find that increased ingestion of fat results in the elimination of alkali from the body on the day following the fat administration, a result they explain as being due to the necessities of fat metabolism. From this it may be concluded that administration of sodium bicarbonate in diabetes prevents the withdrawal of alkali from the body in the preliminary formation of soaps in the intestine, and secondly, promotes the elimination of the acids formed in metabolism.

Reviewing the ground traversed, one appreciates that one is dealing in total diabetes with an organism with no carbohydrate metabolism, with a high protein metabolism, with a more or less pathologic fat metabolism, with an organism requiring sodium bicarbonate and also abnormal quantities of water in order to dissolve the unoxidized products formed.

It seems passing strange that with all the wealth of modern chemistry no compound is known which will replace dextrose in metabolism.

A final question is whether the heat production is less in diabetes than in health. It can now be positively

2. Falta, W.: The Therapy of Diabetes Mellitus, Arch. Int. Med., 1909, p. 159.

3. Klein and Moritz: Deutsch. Arch. f. klin. Med., 1910, xcix, 162.

stated that there is no diminution in the total energy production of the diabetic as compared with the normal man. The diabetic obtains his calorific energy from fat instead of from carbohydrates, and if fat is not given him in sufficient quantity to maintain his requirement he uses his own body fat.

Pettenkofer and Voit in early experiments on a diabetic found no change in the metabolism from the normal. Rubner, using a phlorhizinized dog, found that the heat production was increased by 7 per cent. when glycosuria was induced. The protein metabolism was increased more than threefold, and he attributed the rise in energy production to the increased protein destruction (specific dynamic action of protein). Falta,[4] working with Benedict in Boston, could find no evidence of an increased metabolism in diabetes mellitus. Du Bois and Veeder[5] report a comparison between the metabolism of a normal man and two men suffering from diabetes. One case, which was of the most severe type of diabetes, showed an increase in metabolism of 5 per cent. above the normal. Finally, a preliminary report by F. G. Benedict and E. P. Joslin of work on the metabolism of thirteen patients representing various types of diabetes, declares that the heat production of the diabetic may be 15 per cent. above the normal. Zuntz attributes this rise in metabolism to increased renal activity.

One must take to heart these lessons. The physician can be sure that he is treating his patient properly only when he knows that he is giving him at least the thirty-five calories per kilogram required normally, and these must be contained in materials which the patient can oxidize. Protein will not give more than 10 or 15 per cent. of this requirement of energy. To give fat in sufficient quantity requires all the arts of cookery. Here, as always, when the appetite is no longer a proper guide the physician's knowledge of the patient's requirement is the only possible resource. When instinct fails science must be invoked.

RECENT ADVANCES IN THE TREATMENT OF DIABETES MELLITUS*

GEORGE B. WALLACE, M.D.
NEW YORK

In spite of all the experimental and clinical work on diabetes which has been done in the past years, a specific or etiologic treatment has not been attained. A striking advance has been made in dietetic treatment, however, and, with the clearer and more detailed knowledge of the metabolic derangement present, gained in the past few years, the general principles of dietetic therapy have undergone considerable modification and have been placed on a firmer foundation. Much yet remains unknown or obscure, but in no disease of metabolism can truly scientific dietetic treatment be more successfully carried out than in diabetes. It has been made clear, however, that no routine line of treatment, however sound it may be in principle, can be applied to all cases and that the treatment of one individual case may differ quite markedly from that of another. The future will undoubtedly show a more definite classification into groups or types than is at present possible.

Numerous attempts have been and are still being made to discover a specific for diabetes. Naturally this work centers in the preparation of glandular extracts, and although so far no success has been attained, some of the work may be briefly mentioned.

In 1907 Rennie and Fraser[1] prepared an extract of the islands of Langerhans of the pancreas of a certain genus of fish, the Teleosts. In these pancreas there is a chief island, large enough to be seen macroscopically. Five diabetic patients were treated with the extract and some improvement seemed to follow. The results have not been confirmed nor have additional cases been since reported by these authors. In the following year a paper by Zuelzer[2] appeared in which were reported six cases treated with pancreas extract. The extract was made from dog's pancreas removed during the height of digestion. It was injected intravenously and the glycosuria diminished perceptibly during the two or three succeeding days. A decrease in the acetonuria was also observed. As a result of the injection fever usually occurred. The figures given by Zuelzer are not very convincing, however, and unfortunately the treatment in the hands of others has been disappointing.

Another line of treatment which attracted some attention was introduced by Moore and Abram[3] in 1906. These investigators failed to find prosecretin in the duodenum of diabetics, and on this basis and the assumption that secretin might increase the internal secretion of the pancreas, employed an acid extract of the duodenal mucous membrane (secretin) in the treatment of a few cases of diabetes. Good results were recorded. Their conclusions were shortly afterwards attacked by Bainbridge[4] who found that prosecretin was usually present in diabetics and that the administration of secretin failed to produce any effect on glycosuria. Bainbridge's work has been confirmed by Foster and others in this country.

In 1908 Minkowski[5] again reported the effects of grafting pancreatic tissue in dogs. The graft, if it secures a sufficient blood-supply, grows and functions to such an extent that the animal's own pancreas can be completely removed without the occurrence of diabetes. Here would seem to be a great therapeutic possibility. But in animal experiments the transplantation must be made before diabetes has been induced, otherwise healing will not take place.

The interesting work of Cohnheim[6] may be mentioned here. Cohnheim found that the glycolysis occurring when an extract of muscle was added to sugar was increased if the further addition of an extract of pancreas be made. The extract of pancreas, he assumes, contains a substance of the nature of a hormone. The objection to his work, on the ground of bacterial contamination, seems to have been successfully met, and Hall,[7] repeating his work, has obtained rather striking results. No attempt has been made by these investigators to apply their work to therapeutics, although it might appear to warrant such application.

4. Falta: Wien. klin. Wchnschr., 1909, xxii, No. 16.
5. DuBois, E. F., and Veeder, B. S.: Arch. Int. Med., 1910, v, 37.

* Read in the joint meeting of the Section on Pharmacology and Therapeutics and the Section on Pathology and Physiology of the American Medical Association, at the Sixty-First Annual Session, at St. Louis, June, 1910.

1. Rennie and Fraser: Biochem. Journ., 1907, ii, 7.
2. Zuelzer: Etschr. f. exper. Path. u. Therap., 1908, v, 306.
3. Moore and Abram: Biochem. Journ., 1906, i, 28.
4. Bainbridge: Biochem. Jour., 1908, iii, 82.
5. Minkowski: Arch. f. exper. Path. u. Pharmakol. (Schmiedeberg Festschr.), 1908, p. 395.
6. Cohnheim: Etschr. f. physiol. Chem., 1903, xxxix, 336; xlii, 401.
7. Hall: Am. Jour. Physiol., 1907, xviii, 283.

A relationship between the function of the pancreas and other glands furnishing an internal secretion, especially the adrenals, has recently been demonstrated, and Eppinger, Falta and Rudinger[8] have assumed that the secretions of the thyroid and adrenals are of mutual aid in affecting metabolic processes, while each of these inhibits the pancreatic function and is in turn inhibited by it. On the basis of this assumption, Bruck[9] has suggested that the serum of an animal deprived of its adrenals will have a beneficial effect in diabetes through lessening the adrenal action, which is excessive on account of the removal or diminution of the pancreatic secretion. Such a line of treatment seems absurd. However interesting and important the knowledge of the relationship between the various internal secretions may be, it offers at present no therapeutic application in diabetes.

There has come a tendency in recent years to a less frequent employment of drugs in diabetes therapy. Alcohol is still used to a large extent in the von Noorden clinic and elsewhere, but von Noorden himself has pointed out that amounts larger than 50 c.c. a day are not to be used. Its food value is of no great importance when taken in this quantity, and it is to be recommended chiefly as an aid to digestion, especially of fat. It would seem here that it is as a rule unnecessary, and while there may be some disadvantage in withdrawing it from those who are accustomed to its use, it must be remembered that diabetics seem especially susceptible to its injurious effects on the various organs of the body. It has been shown too that in some cases, at least, the tolerance for sugar is distinctly lessened by a too free use of alcohol. Neubauer[10] has recently recommended alcohol as a means of warding off diabetic coma and reports cases in which the administration of fairly large doses, up to 135 c.c., has given good results. These doses are too large to be used for any length of time with safety, and, in fact, some other observers have failed to obtain any beneficial effects in this direction.

Considerable interest was aroused in this country by Rudisch's[11] paper on the use of atropin in diabetes. Rudisch finds that atropin, when given in fairly large amounts and in conjunction with dietetic treatment, is of great aid in lessening or preventing glycosuria. In the hands of others, however, it has not been so beneficial, and in a series of experiments I have carried out on depancreatized dogs it produced no effect whatever.

Thus it may be seen that little has been accomplished toward an etiologic or specific therapy and to find any actual progress we must turn to dietetic treatment.

There may be first considered here the question of the energy requirement in diabetes. With the great appetite and marked loss in weight and strength so frequently seen in severe cases it is hardly surprising that the taking of large quantities of food should have seemed a necessity. And in spite of the teaching of those having the largest experience, the idea is still somewhat prevalent that diabetics have a much greater energy requirement and accordingly need a much greater supply of food than normal persons. The following out of this idea has undoubtedly led to considerable injury. The experiments of several investigators have shown that an increased energy requirement does not exist in diabetics. Quite recently a series of experiments carried out in accordance with most approved modern methods has been reported by DuBois and Veeder.[12] They show that the energy requirement in diabetes is approximately 34 calories pro kilogram of body weight per day, which is no greater than that in a healthy man. Diets are generally arranged quantitatively, therefore, with the idea of supplying this amount of energy, due allowance being made for the loss through non-utilization of sugar. Over this point a controversy has arisen. Von Noorden[13] states explicitly that the food-supply of a diabetic must at least be equal to that of a healthy man of the same weight and under the same conditions. If less is taken a loss in weight is sure to occur. On the other hand, the opinion is often expressed that severe cases of diabetes may show a lowered level of energy requirement. Kolisch[14] especially has stated that 25 calories pro kilogram weight may lead to an actual increase in body weight, and that in some cases as little as 20 calories may be taken with no loss in weight. He strongly advises the use of a minimum quantity of food, and claims that this offers the best success in the treatment of severe cases.

In practice it is of course out of the question to determine what is the minimal energy requirement for each case, and the work done in this direction serves chiefly in establishing a principle of treatment. The conclusions which may be safely drawn are that high feeding is injurious, that in some cases of severe diabetes the minimal amount of food which will maintain the body weight brings about the best results, and that an amount equal to that required for a healthy man is generally to be recommended. Starvation days and prolonged periods of low diet are not unattended with danger and are to be prescribed only with due consideration of this.

Another subject of importance concerns the quality or class of food comprising the diet. In mild diabetes certain general principles may be laid down for practically all cases. First, the limit of tolerance for sugar is determined. This is done most easily by gradually increasing the daily amount of bread in the test[15] diet until glycosuria reappears. The patient is then placed on a carbohydrate-free diet for at least two weeks. During this time the sugar tolerance will gradually increase and the hyperglycemia, which very frequently persists for some time after the urine is free of sugar, disappears. It is very rarely that acidosis of any dangerous degree occurs during this period. A mixed diet is now given and the new degree of sugar tolerance determined as before. In many cases it will be found that the tolerance approaches the normal; in others it may show only a slight increase, if any. In all cases, however, the subsequent diet should be such that the urine remains sugar-free and there should come at least once in three months a period of carbohydrate-free diet lasting one or two weeks. This treatment may seem quite unnecessary to a patient whose tolerance for sugar has become well-marked, but it should always be enforced.

In severe cases the qualitative arrangement of the diet is of greater importance. It has long been recog-

8. Eppinger, Falta and Rudinger: Ztschr. f. klin. Med., 1908, lxvi, 1.
9. Bruck: Med. Klin., 1908, 1760.
10. Neubauer: München. med. Wchnschr., 1906, lviii, 791.
11. Rudisch, J.: The Treatment of Diabetes Mellitus, THE JOURNAL A. M. A., Oct. 29, 1909, p. 1366.
12. DuBois, E. F., and Veeder, B. S.: The Total Energy Requirement in Diabetes Mellitus, Arch. Int. Med., 1910, v, 37.
13. Von Noorden: Handbuch d. Path. d. Stoffwechs., 1907, ii, 40.
14. Kolisch: Ztschr. f. phys. u. diätet. Therap., 1908, xii.
15. I employ the standard test diet used in the von Noorden clinic for the determination of the severity of the case. This diet contains 75 grams of white bread. The detailed diet and the method of classifying diabetes into mild and severe forms are described by von Noorden in Clinical Treatises on the Pathology and Therapy of Disorders of Metabolism and Nutrition, E. B. Treat & Co., N. Y., 1905, part 7, p. 175.

nized that a glycosuria persisting under a carbohydrate-free diet may be made to disappear if the protein of the food is cut down. Falta, Gigon[16] and others have shown that some patients may have a marked susceptibility to protein; more so, in fact, than to carbohydrate; so that glycosuria may be lessened or at least not increased by cutting down the protein and at the same time adding carbohydrate. The fact is certainly now well established that high protein feeding is not desirable in severe cases. Two hundred grams of cooked meat per day is the maximum allowed by von Noorden and not more than 12 to 15 gm. of nitrogen should appear in the urine. The proteins of eggs and especially of vegetables, are to be preferred to those of meat since they affect the glycosuria less. It is on this account that periods of vegetable feeding are so beneficial.

With regard to carbohydrate feeding in severe cases it is well known that most patients do better when one kind of starch is given alone than when several kinds are taken together. This is the basis for the rice, potato and oatmeal treatments. Of these the oatmeal treatment is of greatest importance. The manner of its action is not understood, but the beneficial effects following its use are at times remarkable. All patients are not by any means, however, equally affected. Although it often brings about a decrease in glycosuria and an increase in sugar tolerance, its chief effect is in lessening acidosis. It is to be given alone, i. e., with no other carbohydrate, and in amounts of 250 gm. a day.[17]

Finally with regard to fat feeding, it is known that although the acetone bodies are formed chiefly from fats, their amount is uninfluenced by the amount of fat in the diet unless in enormous quantities. The lower fatty acids in butter should preferably be removed by washing.

Our knowledge concerning acidosis is as yet very incomplete. In a case in which complete sugar intolerance is present, acidosis may be slight. In another with slight glycosuria the acidosis may be marked. Allard[18] has pointed out that in diabetic dogs the acidosis is not due to a non-utilization of carbohydrate, but probably to a pathologic state of the liver function. It seems established that the condition is not an acidosis in the strict sense, but rather an intoxication due to specific poisons. Of these one at least we know—oxybutyric acid—and we know too that its salts are poisonous. Our efforts in treatment are directed toward preventing the excessive formation of these substances and in hastening their excretion. A strict protein diet increases the acetonuria, but if it can be persisted in an ultimate decrease may often be obtained. So also the addition of carbohydrates to the diet lessens markedly the acidosis, although the glycosuria at once increases. Where coma is threatening, the glycosuria is of course of less importance than the diminution in acidosis. The introduction of periods of vegetable days,[19] and of oatmeal feeding is especially beneficial in persistent acidosis. The action of sodium bicarbonate is chiefly that of increasing the excretion of oxybutyric acid, and one must not be misled by the presence of larger amounts of oxybutyric acid in the urine after its administration. To get the best effects from this salt in severe acidosis it must be given in large amounts, 100 gm. or more a day. Where coma is present it should be given by intravenous injection.

16. Gigon: MÜnchen. med. Wchnschr., 1909, lvi, 907.
17. The oatmeal is given as gruel; 200-300 gm. butter is usually taken also, and there may be added a few eggs and vegetables.
18. Allard: Arch. f. exper. Path. u. Pharmakol., 1908, lix, 338.
19. The following vegetables may be used: asparagus, cauliflower, string beans, Brussel sprouts, cabbage, sauerkraut, spinach, lettuce, endives, olives. In addition 4 to 6 eggs are taken daily.

In general the treatment of severe diabetes may be carried out along the following lines. It is as a rule practically impossible to keep the patient's urine sugar-free, and one should early give up the attempt. Since the main danger lies in the acidosis it is unwise to put the patient on a strict diet for any length of time. In the preliminary treatment there comes first a period of strict diet with 75 to 100 gm. of bread; then follows one of a low protein diet, consisting chiefly of vegetables, and finally one consisting of oatmeal. Each of these is of two or three days' duration. By repeating this procedure for two or three weeks there may be obtained a lowering of acidosis to such an extent that it ceases to be an immediate danger, and there may be obtained also a clear conception of the degree of sugar tolerance. The subsequent treatment is based on the results obtained. A carbohydrate-free diet can often be given for a week or so with marked general improvement. The patient is then allowed a small amount of carbohydrate, or a more prolonged oatmeal or vegetable diet may be given. Every few weeks a period of strict protein-fat feeding of two or three days may be ordered, and once or twice a year a longer period, two or three weeks, should be tried. In conclusion it must be emphasized that no general rule can apply to all cases. Each case must be studied individually and only by such study can the proper line of treatment for any particular case be determined.

THE ACTION OF GLYCOL ALDEHYD AND GLYCERIN ALDEHYD IN DIABETES MELLITUS AND THE NATURE OF ANTIKETOGENESIS *

R. T. WOODYATT, M.D.
CHICAGO

It is generally known that the acetone bodies (acetone, aceto-acetic acid and beta-oxybutyric acid) have their origin in butyric acid, which in turn comes from the fats and to a lesser extent from the proteins, and that the main prerequisite for development of acidosis is a diminution in sugar oxidation. When for any reason the daily oxidation of sugar in the body falls below a certain minimum (say 50 to 75 gm. per day for a man weighing 75 kilograms) then some degree of acidosis supervenes. In the acidosis of starvation, in which lowered sugar combustion is the result of a diminished intake of carbohydrate food, the mere administration of sugar serves to stop the accumulation of acetone bodies. In diabetes, in which the lessened oxidation of sugar is due to the inability on the part of the body to attack the glucose molecule, even when present in abundance, the administration of sugar has less effect than in other acidoses. But, though a diabetic cannot oxidize glucose, he may be able to oxidize other substances chemically allied thereto, such as gluconic acid, saccharic acid, alcohol, etc., and thus lower the existing acidosis. Sugars and allied substances which in oxidizing in the body have the power to lower acidosis are known as antiketogenic substances.

* Read in the joint meeting of the Section on Pharmacology and Therapeutics and the Section on Pathology and Physiology, at the Sixty-First Annual Session, held at St. Louis, June, 1910.

* The original incentive to do this work was received in Munich. When working on the oxidation of glycerin in the second medical clinic of the university, some glycerin aldehyd was prepared, which, at the suggestion of Dr. Otto Neubauer, assistant to Prof. F. Müller, was fed to a diabetic patient then under observation. Later development of the work was done in Chicago in the Medical Department of Rush Medical College (Professor Billings).

How do antiketogenic substances in oxidizing so influence the oxidation of butyric acid that acetone bodies do not accumulate in the body fluids? That they do it is generally recognized. How they do it is an open problem. Nor is it unimportant that we know what the mechanism of the reaction is, for there is little doubt that antiketogenesis is but one manifestation of a more general physiologic principle. Cathcart, for example, has recently shown that oxidizing sugars have a modifying influence on certain aspects of protein metabolism. A study of antiketogenesis furthermore holds out a reasonable hope that among the many substances whose chemical formulas indicate that they possess antiketogenic properties there may be some which will not have the injurious by-effects of the antiketogens now known, and which will find a practical application in the clinic. Finally an elucidation of this mechanism should put into our hands a means for illuminating some of the darkness which now covers the subject of the breakdown of glucose in the body. For, if antiketogenesis is an effect due to certain products which occur in the oxidation of glucose, an interaction between these products on the one hand and one or more of the acetone bodies on the other, as seems highly probable, then, *vice versa*, any substance which is antiketogenic has a certain claim to recognition as a possible breakdown product of glucose in the body. If the substance prove relatively non-toxic and completely oxidizable in the body its claim is strengthened; and if in addition to these qualifications it is known to be one of the substances which occur outside the body when glucose is oxidized under such conditions as most closely simulate those of the body, then its qualifications are strong. With these three considerations in view a systematic study of the whole problem was planned along the following general lines:

First, to tabulate those substances which as the result of later chemical investigations appear to be important as intermediate steps in the laboratory oxidation of glucose under such conditions as have been mentioned. In this class belong the oxidations of sugar in alkaline media by means of hydrogen peroxid, or the air stream, as elaborately worked out by Nef and his pupils. Secondly, to prepare, whenever feasible, sufficient quantities of these substances for use in metabolism experiments in cases of severe human diabetes in which the ability to utilize glucose has so far disappeared that any substance passing into that hexose in the body will be almost quantitatively excreted as such, whereas a high acidosis will always exist and by its fluctuations give an index of the combustion of the antiketogen in the body.

EXPERIMENTAL ANTIKETOGENESIS

In this place the purpose is to mention briefly the results of experiments in which two of the substances which belong in the above-mentioned tabulation were employed, and, in addition, to draw attention to what is believed to be a plausible explanation, in purely chemical terms, of the phenomenon of antiketogenesis. This process appears to be the expression of a simultaneous oxidation and reduction reaction in which aceto-acetic acid, by virtue of its ketone group, acts as the oxidizing agent and hence undergoes reduction, while any substance containing alcohol groups, or the dissociation of which yields the same unsaturated molecules as do alcohols, acts as the reducing agent and hence becomes oxidized.

The first substance to be considered is glycol aldehyd or diose, the simplest possible sugar, of which there is only one. Its formula is $CH_2OH\text{-}COH$. This was fed as a single 20-gm. dose to a patient with severe diabetes, a young man who had been under close observation for a period of two weeks prior to the giving of the experimental substance. Daily determinations were made of the body weight, the amount and specific gravity of the urine, the amount of sugar (by polarization and reduction controlled at intervals by fermentation), the combined acetone and aceto-acetic acid, beta-oxybutyric acid, ammonia and total nitrogen. In addition to these figures accurate observations were made on the ether-soluble acids, both volatile and non-volatile. The patient was kept in bed and all necessary precautions taken with regard to diet and the collection of excretions to insure a consistent metabolism experiment. There was no increase in urinary reducing substances, no appearance of glycol aldehyd in the urine, and no significant change in the total acetone bodies or ammonium. The patient, however, experienced some nausea and a loosening of the bowels. In view of the fact that Paul Meyer saw toxic effects when he administered an impure glycol aldehyd to rabbits, and since two of the oxidation products of glycol aldehyd, namely oxalic acid and glyoxal, are toxic, it seemed likely that these gastro-intestinal symptoms were not merely incidental to the existing acidosis. Accordingly no further use was made of this substance in diabetes mellitus. From animal experiments, however, it is evident that glycol aldehyd can pass over into glucose in the body and that in oxidizing it can act as an antiketogenic body. Owing to its toxicity, glycol aldehyd can hardly be looked on as one of the main splitting products of glucose in the body.

When glucose is placed in an alkaline solution there probably occurs, among other changes, a partial splitting into two molecules of glycerin aldehyd. This aldehyd by intramolecular rearrangement is responsible for formation of lactic acid when the solution contains deficient oxygen, or for glycerinic acid and oxidation products thereof when air or peroxid are present beside alkali (Nef[1]). Glycerin aldehyd is therefore, *in vitro*, an important intermediate product in the breakdown of the hexose molecule by such methods as we are here discussing. Since lactic acid occurs in the body and, furthermore, as is well known, under conditions which make for a deficiency of oxygen in the tissues, *e. g.*, epileptic fits, strychnin convulsions and cyanosis, it would seem highly probable that glycerin aldehyd also plays a part in the bodily dissociation of hexose. So far as I know we have no data on the biologic behavior of this substance except an unsupported statement by Neuberg that in the animal body and in the diabetic organism it is completely oxidized, a statement not entirely accurate.

The glycerin aldehyd used in the experiments to be reported was made by oxidizing glycerin with hydrogen peroxid, using ferrous sulphate as a catalytic agent, by a slight modification of the method of Fenton and Jackson.[2] As so prepared, glycerin aldehyd is a syrup having a sweet, pleasant taste. It contains about 2 per cent. of water, traces of free acid and glycerin, possibly also some glycol aldehyd. It rapidly polymerizes in the presence of alkalies, even traces being sufficient. It gives a vivid aldehyd reaction with Schiff's reagent, reduces Fehling's solution at room temperature, and silvers the wall of test-tubes containing ammoniacal silver oxid solution.

When given to a healthy individual large doses are tolerated without any apparent effect. In cases of diabetes in which 20 gm. of glucose caused appearance of sugar in the urine as high as 50 gm. of glycerin aldehyd were given without causing glycosuria, or the appearance

1. Nef: Ann. d. Chem. (Liebig's) ccclvii.
2. Fenton and Jackson: Roy. Chem. Soc., lxxv, 4.

of any reducing substance in the urine. But it is to be distinctly stated that continued dosages of this kind have not yet been given, and the results, such as already obtained, are no more striking than were originally obtained and falsely interpreted when levulose was exploited as a sugar which could be used by diabetics. Its effect when given in single large doses to severe diabetic cases has been shown in four separate experiments, all of which yielded essentially the same results. When glycerin aldehyd is administered by mouth in single 50 to 75 gm. doses two things are constantly noticeable if the case is ultra-severe: first, an increase in the urinary glucose in an amount approximately equivalent to 25 per cent. of the total triose administered; second, a marked reduction of acidosis as evidenced by a fall in the figures representing the excretion of acetone, aceto-acetic acid and beta-oxybutyric acids, and by a corresponding fall in the figures for ammonia. The total nitrogen also falls a little, as is to be expected when a sugar oxidizes. Little or no glycerin aldehyd goes into the urine as such. There is a relative increase of the ether-soluble urinary acids. There is never diarrhea, but rather more gastric disturbance than may occur when large doses of an ordinary sugar are given at once. The substance is in moderate doses non-toxic. In dogs and rabbits diarrhea is caused by doses of 3 gm. per kilo of body weight.

There are two ways to explain how glycerin aldehyd passes over into glucose. 1. The glycerin aldehyd may be in part built up in the intestinal wall into an assimilation product of sugar; such a protein compound, perhaps, as Pavy proposes, which later on breaking down yields only glucose regardless of what sugar originally went into its composition. 2. The glycerin aldehyd may be simply polymerized into a hexose in the alkaline media of the intestine (or after absorption therefrom) as it is outside the body in the presence of alkali. Under these conditions it yields beta-acrose. Its further conversion into glucose would then be analogous to that which occurs when any hexose is administered by mouth.

If the latter explanation is correct, then a gradual administration of dilute doses of glycerin aldehyd, which would allow the least chance for accumulation of an excess in the bowel or in the blood, and which would therefore limit the time during which the triose would be exposed to the action of alkali, should avoid condensation and result in more complete oxidation. If the conversion into glucose is an expression of the fact that glycerin aldehyd has been built up into something else by cell action, and that it oxidizes directly only when it is given in such inundating excess that much free glycerin aldehyd passes over into the blood unchanged, then gradual doses should cause greater conversion into glucose, and consequently less oxidation.

A case which had already shown 75 per cent. oxidation of glycerin aldehyd and 25 per cent. excretion as glucose when a single 75-gm. dose of the former had been given showed different effects when the triose was given in small repeated doses. For three consecutive days, 40 gm. per day were administered, the doses being a tablespoonful of a dilute solution every few minutes all day.

The average excretion of glucose for five days prior to the experiment was 68 gm.; for the three days of the experiment the average was 105, a difference of 37 gm.; *i. e.*, about 92 per cent. reappeared in the urine as glucose, and in corroboration of this appearance there was no appreciable reduction in acidosis to indicate that any considerable amount had oxidized. From this striking difference in the behavior of gradual and acute dosages it would seem likely that the conversion of glycerin aldehyd into glucose is the work of a bodily assimilative process which requires time and limited concentration for its fulfilment. However, since single heavy doses of glucose cause a higher percentage of oxidation than gradual ones, the difference might be simply an effect of concentration of sugar in general in the blood. All of these findings support the idea that glycerin aldehyd may well be a normal intermediate product in the bodily oxidation of sugar.

MECHANISM OF ANTIKETOGENESIS

It now remains to be shown what the mechanism of the reaction is, whereby sugars and such substances as alcohol, glycerin, glycerin aldehyd, gluconic acid, etc., in the course of their oxidation depress acidosis. As already stated, this is an open problem and one for the solution of which there is no good hypothesis. Nasse's "secondary oxidation" and Naunyn's suggestion that the burning sugar ignites the acetone bodies as a conflagration sets fire to objects in its neighborhood, are really more graphic than chemical. In this communication a suggestion will be made as to the possible nature of this phenomenon, to which Satta gave the name antiketogenesis.

In a long series of contributions to our knowledge of the chemistry of light Ciamician and Silber[3] showed that when ketones, diketones, keto-acids and nitro-bodies are mixed with alcohols (monatomic or polyatomic) and exposed for varying periods to the Italian sunlight, reactions occur in which the alcohols are oxidized and the nitro-bodies, ketones, etc., are reduced. The following serves to illustrate a reaction of this type: In this

$O:C_6H_4:O$	+	$CH_3.CH_2OH$	=	$HO.C_6H_4.OH$	+	$CH_3.COH$
Benzoquinone		Ethyl alcohol		Hydroquinone		Acetaldehyd

instance the two CO or ketone groups of the benzoquinone have each taken up one H atom to give the reduction product hydroquinone, whereas the alcohol group of the ethyl alcohol has lost two H atoms and been converted into the oxidation product, acetaldehyd. One of the substances with which these authors worked was levulinic acid, CH_3-CO-CH_2-CH_2-COOH, which, like aceto-acetic acid contains a CO group—is, in other words, a keto-acid. Levulinic acid when mixed with alcohol and exposed to the sunlight undergoes reductions to the corresponding oxyacid, gamma-oxy-valerianic acid, CH_3-CHOH-CH_2-CH_2-COOH, the alcohol going, as in the above instance, to acetaldehyd. Here then is a chemical reaction capable of fulfilment without the use of strong reagents or extraordinary physical conditions, in which a ketone outside the body may be destroyed by such substances as are known to be "antiketogenic" in the body. And the destruction of the ketone in these instances is simultaneous with oxidation of the alcohol, glycerin or sugar, as the case may be; in fact, the doubly-bound oxygen actually serves as the oxidizing agent.

Now, since aceto-acetic acid, CH_3-CO-CH_2-COOH, like levulinic, a keto-acid, may actually be reduced by means of sodium amalgam to beta-oxybutyric acid, CH_3-CHOH-CH_2-COOH, it would seem likely that aceto-acetic acid would behave with alcohols and sunlight in the same way as the other substances investigated by Ciamician and Silber. As a matter of fact, it has been possible to show that aceto-acetic acid, when mixed with

3. Ber. d. deutsch. chem. Gesellsch., xxxiv, 530, 2040; xxxv, 1992, 3593, 4128; xxxvi, 1575.

absolute alcohol and long exposed to the action of light, does undergo a reduction to beta-oxybutyric acid, while the alcohol burns to acetaldehyd. Magnus-Levy and others have leaned to the view that aceto-acetic acid, when formed in the body, is destroyed by a direct acid splitting into two molecules of acetic aid, which then oxidize further; whereas, if we assumed that the bodily destruction of aceto-acetic acid produced in accordance with the mechanism of Ciamician and Silber's reaction, we would then have to consider that aceto-acetic acid is destroyed by reduction, not splitting followed by oxidation. Is there any evidence to support such a conception?

As already stated, the Italian writers found that nitro-bodies, like ketones, underwent reduction under the conditions in question. Nitrobenzol, for example, is reduced by alcohol to anilin, according to the general rule. Now, nitrobenzol, when ingested by men or animals, undergoes in the body reduction to para-amino-phenol, a near derivation of anilin and one which occurs in the urine when anilin itself is ingested. Outside the body the reduction depends on simultaneous oxidation of alcohol groups. Is it so dependent in the body? If so, animals in which sugar oxidation is virtually eliminated by the use of phlorhizin and abstinence from food should be unable to reduce nitrobenzol to para-amino-phenol. This appears to be the case. Recently Dakin,[4] Freedmann and Masse Blum[5] have shown that acteto-acetic acid when intravenously injected (as a solution of the sodium salt) into dogs and cats is actually reduced to beta-oxybutyric acid, whereas it is well known that in acidosis very considerable amounts of aceto-acetic acid may be spontaneously introduced into the blood-stream without the appearance of beta-oxybutyric acid in the urine. In favor of the idea that aceto-acetic acid is normally destroyed by reduction in the course of a simultaneous oxidation and reductive reaction like those exploited by Ciamician and Silber, there is the following condensed evidence: Aceto-acetic acid in the presence of an alcohol outside the body is reduced, the alcohol undergoing simultaneous oxidation. Aceto-acetic acid is reduced in the body when sugar (alcohol) oxidation is going on (Dakin et al.). When sugar oxidation fails aceto-acetic acid is spontaneously excreted in large amounts, and moderate amounts of aceto-acetic acid may exist prior to the appearance of any beta-oxybutyric acid in the urine. Nitro-bodies, which act outside the body in the same general way as aceto-acetic acid and other ketones, are also reduced in the healthy body, but when sugar oxidation is eliminated they, too, apparently fail to be reduced. In every case the substances which destroy acidosis in the body also reduce ketones, nitro-bodies, etc., in the sunlight.

Reduction of aceto-acetic acid will account for the disappearance of this substance and its splitting product acetone, *i. e.*, two of the acetone bodies. It must now be asked what becomes of the beta-oxybutyric acid which is formed in the process. There is always the possibility that beta-oxybutyric acid can be oxidized in the body in two different ways. If so, then in health one would conceive of a double oxidation of beta-oxybutyric acid, two products being formed, aceto-acetic acid on the one hand and a dioxybutyric acid on the other. The latter substance, being easily oxidizable, would rapidly burn further. The aceto-acetic acid as fast as formed would be reduced back again into beta-oxybutyric acid. In this way all beta-oxybutyric acid would eventually have to oxidize over the dioxybutyric route, this being the only way in which it could oxidize and stay oxidized.

NOTE.—One might think here of a sort of organic chemical equilibrium between molecules of, say, beta-oxybutyric acid and those dissociation products thereof whose existence is the prelude to formation of alpha and alpha-beta oxyacids respectively, such equilibrium being comparable to that which exists in a solution of an electrolyte between the molecules of the electrolyte and its ions as expressed for NaCl by the familiar formula

$$\frac{Na \times Cl}{NaCl} = K.$$

If the proportionate concentrations of beta particles becomes lessened by a rapid excretion of aceto-acetic acid instead of being maintained by constant reductions of the same the equilibrium would become disturbed and in the attempt to maintain it a very high aggregate amount of beta products would be formed and a very low aggregate of alpha-beta products. Normally the entire balance may be reversed in simple accordance with the laws of mass action.

4. Dakin, H. D.: A New Mode for the Formation of Beta-Oxybutyric Acid in the Animal Organism, THE JOURNAL A. M. A., April 30, 1910, p. 1441.
5. Munchen. med. Wchnschr., lvii, 1796.

THE RELATION OF THE PANCREAS TO DIABETES *

JOSEPH H. PRATT, M.D.
BOSTON

Over two hundred years ago Conrad Brunner[1] showed by experiments on dogs that a large portion of the pancreas could be removed without affecting the health of the animals. Progress in the physiology of the pancreas was slow and as late as 1888 the conclusions reached by Martinotti[2] in his experimental studies published that year were those generally accepted. Martinotti asserted that after the complete extirpation of the pancreas no disturbance resulted either in the general condition or in the digestive functions. The dogs in fact gained in weight. Claude Bernard[3] had asserted that shutting off the pancreatic juice by injecting oil into the ducts under considerable pressure, caused a serious disturbance in the absorption of fat, but subsequent investigators were unable to confirm his observations.

The idea that there was some relation between diabetes and disease of the pancreas was entertained by a number of clinicians, including Frerichs,[4] Bouchardat,[5] Lancereaux,[6] Popper,[7] Lapierre,[8] and Baumel,[9] who were impressed with the frequent association of the two conditions. They thought that diabetes was the result of a disturbance in the composition of the pancreatic juice so that it acted abnormally on the sugar-producing foods in the intestine, or that the juice deficient in some particular was absorbed from the intestine and interfered with carbohydrate metabolism in the tissues of the body.

In 1889 von Mering and Minkowski[10] made the important discovery that after complete extirpation of the

* Read in the joint meeting of the Section on Pharmacology and Therapeutics and the Section on Pathology and Physiology of the American Medical Association, at the Sixty-First Annual Session, held at St. Louis, June, 1910.

1. Brunner, Conrad: Experimenta nova circa Pancreas, Amsteled, 1682; Miscellanea nat. curios, Dec. 11, 1688; cited by von Mering and Minkowski.
2. Martinotti, G.: Glor. d. r. Accad. di med. del Torino, 1888, pp. 348, 383.
3. Bernard, Claude: Leçons de physiologie expérimentale, Paris, 1856, ii, 274.
4. Frerichs: Ueber den Diabetes, Berlin, 1884; cited by Lombroso.
5. Bouchardat: De la glycosurie ou diabète sucré, Paris, 1875, p. 108.
6. Lancereaux: Bull. de l'Acad. de méd., 1877, series 2, vi, 1215.
7. Popper: Oesterr. Ztschr. f. prakt. Heilk., 1868, xiv, 194.
8. Lapierre: Thèse de Paris, 1879; abstracted by Sauerbeck.
9. Baumel: Montpellier méd., 1881, i, 105; ii, 400; 1882, i, 31, 442; 1886, i, 213; cited by von Mering and Minkowski.
10. Von Mering and Minkowski: Zentralbl. f. inn. Med., 1889, xxiii, 393; Arch. f. exper. Path. u. Pharmakol., 1890, xxvi, 371.

pancreas in dogs a severe and rapidly fatal diabetes always developed. The secretion of the sugar began usually on the day following the operation, but occasionally within five or six hours. The failure of the earlier experimenters to produce diabetes by extirpation of the pancreas was readily explained, as none of them had succeeded in removing all the pancreatic tissue. Von Mering and Minkowski found that the diabetes developed in dogs that had been kept fasting for a long time and in which the intestines were empty. This showed that the diabetes could not be due to the cessation of some hypothetic action which the pancreatic juice has on the ingested food, for the diabetes developed promptly although there was no food in the intestine. Hence they concluded that extirpation of the pancreas produced some disturbance in the intermediate metabolism. There are two possibilities, they said: 1. There is an accumulation of some substance in the body, possibly a ferment or a poison, which is normally destroyed by the pancreas. After the pancreas has been removed this substance causes the elimination of the sugar. 2. The destruction of sugar in the organism is a normal function of the pancreas.

The experiments of von Mering and Minkowski have been repeated and confirmed by many investigators. The total removal of the pancreas in the dog, cat and other mammals always produces a severe and rapidly fatal diabetes.

At the time of the discovery of pancreatic diabetes little was known of the internal secretion of ductless glands. Brown-Séquard's[11] views on the internal secretion of the testes were not published until 1889. Claude Bernard[12] as early as 1855 had used the expression *sécrétion interne* in describing the glycogenic function of the liver, but that term is not used by von Mering and Minkowski in their first papers. They did conclude, however, that the experimental diabetes produced by removal of the pancreas was due to the cessation of a "specific, hitherto unknown function of the pancreas." Lépine[13] a little later asserted that the pancreas furnished an internal secretion, and he attempted to prove by experiments that this secretion contained a ferment with glycolytic power which passed from the pancreas into the blood, and was taken up by the leukocytes. Lépine supported his theory by the demonstration that the sugar-destroying power of the blood was diminished in experimental pancreatic diabetes as well as in human diabetes. The extirpation of the pancreas removed the chief source of production of this ferment and thereby the glycolytic power of the blood was diminished. This work seemed to furnish strong evidence that the pancreas produced an internal secretion, but his claims were quickly disproved by a number of investigators (Arthus,[14] Kraus,[15] Minkowski[16] and others). It was shown that the glycolysis observed by Lépine was probably due to post-mortem changes in the blood. His methods were called in question and his statement that the glycolysis in normal blood was greater than in diabetic blood could not be verified. Even if Lépine's observations had been correct the ferment content of the blood alone would not have been sufficient to produce the normal destruction of sugar in the body.

11. Brown-Séquard: Arch. de physiol., 1889, xxi, 651; Compt. rend. Soc. biol., 1889, pp. 415, 420, 454.
12. Bernard, Claude: Leçons de physiol. expér., Paris, 1855, i, 96.
13. Lépine: Lyon méd., 1889, lxii, 619; Arch. méd. expér., 1891, p. 222.
14. Arthus: Arch. de physiol., 1890, p. 425.
15. Kraus: Ztschr. f. klin. Med., 1892, xxi, 315.
16. Minkowski: Arch. f. exper. Path. u. Pharmakol., 1893, xxxi, 85.

Years later when O. Cohnheim's[17] studies appeared it seemed as if the long-sought-for internal secretion of the pancreas was at last discovered. Cohnheim found that a fresh extract of the pancreas does not destroy sugar and that muscle juice has only slight action; but when the two are combined the mixture acquires marked glycolytic power. The substance furnished by the pancreas is not destroyed by heat. It is supposed to activate the ferment of the muscle which then is able to cause the combustion of sugar. The muscle ferment is thermolabile and readily destroyed by any adverse condition. An excess of the pancreatic excitor has an inhibitory action. Cohnheim's observations have been supported by Arnheim and Rosenbaum,[18] Hirsch,[19] De Witt[20] and Hall,[21] but the later studies of Simpson[22] as well as the work of Claus and Embden,[23] have thrown doubts on their value. Vahlen[24] believes that he has obtained a product of the pancreas which produces the vital destruction of sugar in a purely katalytic manner.

Chauveaux and Kaufmann,[25] mindful of the teachings of Claude Bernard,[26] attempted to modify his hepato-neurogenic theory of diabetes to accord with the discovery of pancreatic diabetes. The source of the sugar according to their views is the liver. The normal production of sugar in the liver is under the regulating influence of the nervous system and the pancreas. The nerves passing to the liver carry stimulating impulses, while the pancreas has an inhibitory action on the formation of sugar. Although at first they held to the view that this influence of the pancreas on the sugar-forming function of the liver was through the nervous system, they later, as a result of experimental study, supported the view that the pancreas furnished an internal secretion which was carried by the blood to the liver. When the pancreas is extirpated the inhibitory influences cease. Pancreatic diabetes would thus be the result of an increased production of sugar, and not of diminished destruction. No recent writers have accepted the theory of Chauveaux and Kaufmann.

The theory that the experimental diabetes produced by von Mering and Minkowski is due to lack of the internal secretion of the pancreas has been accepted by most physiologists and pathologists. It has had its opponents, however, chief of whom has been Pflüger.[27]

This investigator contended that the antidiabetic power of the pancreas is under the control of the nervous system, and he actively opposed the theory that the pancreas furnished an internal secretion. He asserted that there was in the wall of the duodenum an "antidiabetic" central organ rich in ganglion cells, which by means of nerves passing to the pancreas governed the antidiabetic power of that gland. Pflüger supported his position by experiments on frogs. After extirpation of a portion of the duodenum in contact with the pancreas the frogs developed as severe a diabetes as was ever observed after total extirpation of the pancreas. If

17. Cohnheim, O.: Ztschr. f. physiol. Chem., 1903, xxxiv, 336; 1904, xlii, 401; 1905, xliii, 547; 1906, xlvii, 253.
18. Arnheim and Rosenbaum: Ztschr. f. physiol. Chem., 1904, xl, 220.
19. Hirsch: Beitr. z. chem., Physiol. u. Path., 1904, iv, 535.
20. De Witt: Jour. Exper. Med., 1906, viii, 193.
21. Hall: Am. J. Physiol., 1907, xviii, 283.
22. Simpson: Bio-Chemical Jour., 1910, v, 126.
23. Claus and Embden: Beitr. z. chem., Physiol. u. Path., 1905, vi, 214-343.
24. Vahlen: Zentralbl. f. Physiol., 1908, xxii, 201.
25. Chauveaux and Kaufmann: Compt. rend. Soc. biol., Paris, 1903, xlv, 17, 29; Kaufmann: Compt. rend. Soc. biol., Paris, 1894, pp. 254, 284, 669.
26. Bernard: Leçons sur le diabète et la glycogénèse animale, Paris, 1877.
27. Pflüger: Arch. f. d. ges. Physiol., 1907, cxviii, 265, 267; 1907, cxix, 227, 297; 1908, cxxii, 267; 1908, cxxiii, 323; 1908, cxxiv, 673.

this view was correct, said Pflüger, then cutting the nerves which pass from the duodenum to the pancreas would produce diabetes with the intestine and pancreas uninjured. As he expected, this simple procedure produced as marked a diabetes as when the pancreas or duodenum was extirpated. Only a few experiments were performed on dogs, but Pflüger asserted that removal of the duodenum produced glycosuria, although he emphasized the difficulty of the operation. The speedy death of the animals rendered his experiments on dogs unsatisfactory. Pflüger concluded on the basis of his experimental work that the pancreatic diabetes of von Mering and Minkowski was really duodenal diabetes, and was due to the destruction of nerves passing from the antidiabetic centers in the duodenum.

Pflüger's study of "duodenal diabetes" and his theory of the nervous origin of diabetes attracted much attention. It was not long before Ehrmann,[28] Lauwens,[29] Rosenberg,[30] and Minkowski[31] showed the error of Pflüger's conclusions, at least so far as dogs and other mammals were concerned. They found that the total removal of the duodenum in the dog was not followed by diabetes.

In six dogs and two cats Dr. Murphy and I have dissected the pancreas free from the duodenum, leaving only a few branches of the pancreatico-duodenal artery and vein connecting the two. In none of the experiments did glycosuria result, although the nerves passing from the duodenum were cut and a new nervous connection was prevented by drawing the omentum between the duodenum and the corpus pancreatis.

Recent publications by Rosenberg[32] and Löwit[33] give satisfactory evidence that "duodenal diabetes" does not exist in frogs. There is then no justification for the use of the term. The glycosuria observed by Pflüger was a *Kaltediabetes* produced by keeping his frogs on ice.

Transplantation experiments support the theory that the pancreas furnishes an internal secretion. Minkowski[34] and later Hédon[35] and Thiroloix[36] drew a portion of the pancreas out of the peritoneal cavity and placed it beneath the skin of the anterior abdominal wall. The remainder of the gland was extirpated, but sugar did not appear in the urine. When the graft of transplanted pancreas was removed severe diabetes developed. Pflüger[37] and Hédon[38] were not convinced that this experiment excluded the nervous origin of diabetes, for the stalk of mesentery which furnished the blood-supply to the transplanted portion of pancreas also conveyed nerves which connected the graft with the central nervous system. Hédon[38] found that in a large series of experiments cutting of this mesenteric pedicle was followed by diabetes except in three animals. Pflüger's explanation of these exceptions is that the nerves were not severed when the pedicle was cut. But, as Minkowski[31] points out, Pflüger brought forward no evidence in support of his statement. There is really no doubt that necrosis of the transplanted glandular tissue, due to an insufficient blood-supply, is the cause of the diabetes that follows section of the vascular pedicle. Lombroso[39] working with Minkowski recently repeated this experiment of Hédon. After the vascular stalk supplying the transplanted piece of gland was cut there was only a slight glycosuria lasting but three days. Removal of the pancreatic graft was followed by a fatal diabetes. Success in this experiment was probably due to a good-sized artery of the skin that had grown into the pancreatic tissue, and which nourished the graft after the former blood-supply was shut off.

An experiment by Martina[40] furnishes equally strong evidence against Pflüger's neurogenic theory of pancreatic diabetes. The method that Payr employed with success in implanting pieces of thyroid into the spleen was used by Martina, who took a portion of the pancreas wholly free from its vessels and nerves and imbedded it into the spleen of a dog. The animal survived the extirpation of the remainder of the gland the unusually long time of three months, although diabetes of no slight intensity developed.

Forschbach[41] effected the union of two animals according to the method devised by Sauerbruck and Heyde for producing parabiosis. The abdominal walls of two animals were united in adjacent flanks and the peritoneal cavities were brought into communication. There was an exchange of blood and lymph, but certainly no transfer of nervous impulses from one dog to the other. It was found that the parabiosis of a depancreatized dog with a normal animal either prevented diabetes or reduced the glycosuria to one of slight degree. The most plausible explanation of this is that the pancreas of the normal dog furnished some substance to the blood which was carried in the circulation to the depancreatized dog and enabled it to assimilate sugar. Probably some of the sugar passed from the depancreatized dog into the blood-stream of the normal animal and was consumed in its tissues, but Forschbach presents experimental evidence that this was not the only cause of the diminished glycosuria in the dog from which the pancreas had been removed.

There is no proof that the pancreas produces an internal secretion, although the theory is more probable than any other that has been advanced. Pflüger deserves credit for showing how little actual evidence has been brought forward in its support, and his criticism has been a stimulus to many investigators. In his last communication on the subject published in 1909 he said:[42]

> I am, indeed, still of the opinion that the internal secretion has not been demonstrated to be the cause of pancreatic diabetes. What is not proved, however, may nevertheless be true. That is my point of view.

The strongest argument against the theory is the failure to cure pancreatic diabetes or to diminish the glycosuria by the injection of pancreatic extracts or by feeding the fresh gland. Hédon has asserted that the internal secretion of the pancreas will remain a hypothesis until it is possible to isolate from the gland a substance, the injection of which will check completely the diabetes of a depancreatized dog. This investigator performed a large series of experiments with aqueous and glycerin extracts of the pancreas. Even with strict attention to asepsis, abscesses formed at the site of injec-

28. Ehrmann: Arch. f. d. ges. Physiol., 1907, cxix, 295.
29. Lauwens: Arch. f. d. ges. Physiol., 1907, cxx, 623.
30. Rosenberg: Arch. f. d. ges. Physiol., 1908, cxxi, 358.
31. Minkowski: Arch. f. exper. Path. u. Pharm., 1908, lviii, 305.
32. Rosenberg: Biochem. Ztschr., 1909, xvIII, 95.
33. Löwit: Arch. f. exper. Path. u. Pharm., 1909, lx, 427; 1909, lxii, 47.
34. Minkowski: Berl. klin. Wchnschr., 1892, p. 90; Arch. f. exper. Path. u. Pharmakol., 1893, xxii, 271.
35. Hédon: Arch. d. Physiol., 1892, iv, 617.
36. Thiroloix: Compt. rend. Soc. biol., Paris, 1892, p. 966.
37. Pflüger: Arch. f. d. ges. Physiol., 1907, cxviii, 267.
38. Hédon: Travaux de la physiologie, 1898; cited by Pflüger.
39. Lombroso: Ergebn. d. Physiol., Wiesbaden, 1910, ix, 11.
40. Martina: Deutsch. med. Wchnschr., 1908, No. 1, p. 45.
41. Forschbach: Arch. f. exper. Path. u. Pharmakol., 1909, lx, 131.
42. "Ich bin aber allerdings auch heute noch der Ansicht dass die innere Secretion als Ursache des Pankreasdiabetes nicht bewiesen ist. Das nicht Bewiesen kann aber noch wahr sein. Das ist mein Standpunkt." Pflüger: Arch. f. d. ges. Physiol., 1909, cxxviii, 125.

tion unless the extract was passed through a porcelain filter. He was unable to diminish by the use of any pancreatic preparation the intensity of the experimental diabetes. He suggested the possibility that the negative results were due to the presence of antagonistic substances in the pancreatic extract which neutralized each other in the organism.

Many attempts have been made to treat diabetes in man by feeding the fresh pancreas or by administering pancreatic preparations, but without success. Recently Spooner and I[43] fed the fresh gland to a man known to have pancreatic diabetes. This patient had had suppurative pancreatitis in 1903, and at operation a large amount of necrotic pancreatic tissue was removed. Three years later diabetes developed. He ate two or three raw pancreases daily for a month, but the glycosuria was not diminished.

Starling[44] stated that if the internal secretion of the pancreas is of the same nature as the other bodies which he grouped together under the name of hormones, it should be possible to isolate the active principle from the gland and by introducing it into the circulation to influence favorably cases of diabetes due to pancreatic disease.

Zuelzer[45] in 1907 found that he could prevent adrenalin diabetes by the injection of a pancreatic extract. He later[46] reported that he had used this preparation with success in human diabetes. In preparing the active principle he removed the pancreas, which he had previously rendered hyperemic, at the height of digestion. The juice of the gland was expressed and the protein removed with alcohol. An examination of his report of seven cases shows that the diminution of the glycosuria was only transitory, and that the injection produced a severe febrile toxic condition. Forschbach[47] tried the effect of Zuelzer's "hormone" in two cases of diabetes, but owing to the serious symptoms which resulted its use was abandoned. Probably the decrease in the glycosuria was due largely, if not entirely, to the toxic action of the extract, as instances have been observed, both in man and animals, in which the glycosuria diminished in consequence of a febrile infection.

Pflüger[37] pointed out that the living pancreas may possibly supply the circulating blood with an active internal secretion as rapidly as it is formed, so that there is never more than a trace of the secretion present in the gland. If this be so an extract of the pancreas would not be expected to produce any decrease of the glycosuria.

It is necessary to remove four-fifths or more of the pancreas in order to produce diabetes. Sandmeyer[48] found that if the ducts were tied and partial extirpation of the pancreas performed diabetes developed after a time. Gradual degeneration of the gland followed obstruction of the outflow of the external secretion produced by tying the ducts. Even Pflüger[37] admitted that Sandmeyer's work was evidence in favor of the theory that the pancreas plays a part in the production of diabetes, for even small remains of pancreatic tissue prevented the development of glycosuria which first appeared when they were degenerated. According to Pflüger this fact is the only one that favors the theory that the pancreas furnishes an internal secretion. I have found in my experimental study additional evidence of a similar nature. If all the pancreatic juice is excluded from the intestine rapid atrophy of the gland takes place and the limit of assimilation for glucose drops quickly. In one dog it fell from 121 gm. to 65 gm. within three weeks. In two other dogs it dropped to 35 gm. in from two to three months.

Spooner and I found that the limit of assimilation was raised in an animal with atrophy of the pancreas, by feeding the fresh gland. In a dog with the pancreas entirely separated from the duodenum the limit of assimilation was determined at frequent intervals for a year and it was never more than 35 gm. This animal was then given three sheep's pancreases a day for six weeks and the limit of assimilation rose to 80 gm. It continued to rise for a short time after the administration of fresh pancreas was discontinued and the maximum reached was 100 gm.

The most reasonable explanation for this remarkable increase in the animal's ability to assimilate carbohydrates is that the pancreas fed to the dog contained some substance that passed from the digestive tract into the blood and aided in the metabolism of glucose. It certainly supports the theory of the pancreatic origin of diabetes rather than the neurogenic hypothesis.

Evidence gained from histologic study indicates that there is a close connection between lesions of the pancreas and diabetes. The areas described by Langerhans[49] in 1869 and which bear his name have been thought by many investigators to have as their function the production of an internal secretion. This conception of their nature was first put forward by Laguesse[50] in 1893.

The islands of Langerhans are of irregular outline, as De Witt[50] has shown in her reconstruction models. They are composed of solid columns of polygonal cells with round or oval vesicular nuclei and with a very finely granular protoplasm that does not stain well with eosin. Lane[51] has described two types of cells containing granules of different character, both of which differ in chemical nature from the zymogen granules of the cells of the acini. The islands are highly vascular, the veins and capillaries forming a rich plexus of thin-walled blood-vessels (sinusoids) in intimate relation with the epithelial cells. Flint[52] has shown by means of the digestion method that the connective tissue of the islands is characteristically arranged and differs from that of the rest of the lobule. There is a delicate fibrous capsule which often covers only a portion of the island. It is generally held that these structures are not connected with the excretory ducts, but in pathologic conditions communications with the ducts have occasionally been found.

Histologically there is close resemblance between the islands of Langerhans and the parathyroid and others of the ductless glands. It was on the structural peculiarities of the islands that Laguesse based his view that these bodies are concerned solely with the internal secretion of the pancreas.

Lewaschew,[53] Laguesse,[50, 54] and others regard the islands as acini that have undergone temporary alterations, and they hold that they may change back into secreting acini. It was maintained by Lewaschew on the basis of an experimental investigation that stimulation of

43. Pratt and Spooner: Unpublished observations.
44. Starling: Zentralbl. f. d. ges. Physiol. u. Path. d. Stoffwechs., 1907, ii, 209.
45. Zuelzer: Berl. klin. Wchnschr., 1907, p. 474.
46. Zuelzer: Ztschr. f. exper. Path. u. Therap., 1908, v, 307.
47. Forschbach: Deutsch. klin. Wchnschr., 1909, p. 2053.
48. Sandmeyer: Ztschr. f. Biol., 1894, xxxi, 12.
49. Langerhans: Inaug.-Dis., Berlin, 1869; abstracted by Sauerbeck.
50. Laguesse: Compt. rend. Soc. biol., Paris, 1893, p. 819; Jour. de l'anat. et physiol., 1894, xxx, 79, 591, 731.
51. Lane: Am. Jour. Anat., 1907, vii, 409.
52. Flint: Arch. f. Anat. u. Entwicklungsgesch., 1903, p. 61.
53. Lewaschew: Arch. f. mikrosk. Anat., 1886, xxiv, 452.
54. Laguesse: Compt. rend. Soc. biol., 1908, lxv, 139.

the pancreas increased the number of islands. Dale[55] and more recently Laguesse[56] claim to have demonstrated that starvation has the same effect. Dale found that injections of secretin exhausted the acini, thereby converting many of them into islands. Opie[57] in a careful study was unable to confirm Lewaschew's observations. Vincent and Thompson[58] have repeated Dale's experiments and agree with his conclusions.

The theory that the islands are under normal conditions anatomically independent of the rest of the pancreas has stronger evidence for its support. The studies of Pearce[59] and Helly[60] show the early differentiation of these structures in the embryo. The observations of Flint,[62] De Witt[20] and Lane[61] do not accord with the *balancement* theory of Laguesse, but favor the view that the islands of Langerhans are independent structures. The evidence from histologic investigations supports the theory that the pancreas produces an internal secretion.

Schaefer[61] in 1895 was the first to suggest that pathologic alterations of the islands of Langerhans might be the cause of diabetes. Ssobolew[62] announced in 1900 that the islands were absent in two diabetic subjects examined by him. Opie[63] in the same year described marked lesions of the islands of Langerhans in diabetes. His admirable papers aroused great interest and gave a new impetus to the histologic study of the pancreas. Excellent critical reviews of the literature of the subject have been published by Sauerbeck[64] in 1904 and Lombroso[29] in 1910. There is quite general agreement as to the pathologic findings, but much dispute as to their interpretation. As a result of the investigations of the past decade it can be definitely stated that pathologic changes in the pancreas occur in the majority of cases of diabetes. Occasionally the lesions are limited to the islands of Langerhans and occasionally to the acini, but usually both are involved in varying degree.

Most investigators of the subject hold one of two views. The "acinar theory," as it may be called, which was advanced by Hansemann[65] in 1894 has among its other supporters Gutmann,[66] Karakascheff,[67] Herxheimer[68] and Schmidt.[69] They believe that the internal secretion is furnished by the acini, and that pancreatic diabetes is due to disease of the acini.

The theory that the islands of Langerhans alone are concerned with the internal secretion of the pancreas, and that diabetes is due to disease of these structures and not of the acini, is held by Ssobolew,[70] Opie[71] Sauerbeck,[64] De Witt,[20] MacCallum,[72] Cecil[73] and others.

From the literature Sauerbeck[64] collected reports of 176 cases of diabetes in which the pancreas had been examined histologically. In fifteen the gland was normal, in six the lesions were confined to the islands, in twenty-seven to the acini. This would indicate that pathologic alterations are more frequently limited to the acini than to the islands, but Cecil,[73] in ninety cases of diabetes in which he examined the pancreas, found the islands affected in every case in which the acini were involved.

Ssobolew,[70] De Witt[20] and Visentini[74] tied the ducts or placed ligatures about the gland in dogs or cats and found that the acini degenerated, but that the islands were left intact. MacCallum[72] separated one of the two branches of the pancreas from the remainder of the gland. At the end of seven months the atrophied portion contained only the remnants of ducts and masses of cells, which he regarded as the islands of Langerhans.

I have found in a series of experiments on dogs and cats that when all the pancreatic juice is excluded from the intestine there is degeneration and destruction of both the acini and the islands, associated with a great and diffuse development of connective tissue. This has been a constant finding and is a striking contrast to the results obtained by other investigators.

Lombroso,[29, 75] for example, 140 days after ligation of the "pancreatic duct" in a dog found that "not only the islands, but many large groups of acini, preserved a completely normal appearance." Zunz and Mayer[76] confirmed these results. Other investigators as cited above found the islands preserved, but the acini sclerosed or destroyed.

Failure to occlude permanently all the ducts is the explanation of these findings. In Lombroso's experiments and in those of Zunz and Mayer we have evidence that the pancreas was still producing its external secretion and furnishing it to the intestine, for metabolism experiments conducted on their animals showed that the absorption of fats and proteins was normal. The fact that a part of the gland was functionating explains the preservation of the secreting tissue. Hess[77] was the first to point out an error into which experimenters have stumbled. He discovered that there were usually more than two excretory ducts in the dogs; hence when only two were tied the pancreatic juice entered the intestine through the accessory channel. Even when all the ducts are tied, necrosis may occur and sinuses carry the secretion into the duodenum, as I discovered early in my experimental work.

Before Minkowski performed his skilful operations it was held that total removal of the pancreas was not followed by any symptoms. It is now known that the failure of the early experimenters to produce diabetes was due to the fact that they did not succeed in removing all the pancreatic tissue. So to-day it is generally held that there is no disturbance in the digestion and absorption of food when the pancreatic juice is excluded from the intestine. This belief is based on the work of Lombroso and others who did not succeed in keeping all of the pancreatic secretion out of the intestine. Lamson, Marks, and I[78] showed conclusively in a recent study that if all the pancreatic secretion is excluded there is always a great decrease in the amount of fat and proteins assimilated. There is marked loss in weight and

55. Dale: Proc. Roy. Soc., London, 1904, lxxiii, 84.
56. Laguesse: Comt. rend. Soc. biol., 1910, p. 369.
57. Opie: Bull. Johns Hopkins Hosp., 1900, xi, 205.
58. Vincent and Thompson: Internat. Monatschr. f. Anat. u. Physiol., 1907, xxiv, 91.
59. Pearce: Am. Jour. Anat., 1903, ii, 445.
60. Helly: Arch. f. mikrosk. Anat., 1905, lxvii, 124.
61. Schaefer: Lancet, London, 1895, ii, 321.
62. Ssobolew: Cenaralbl. f. allg. path. u. path. Anat., 1900, xi, 202; Arch. f. path. Anat., 1902, clxviii, 91.
63. Opie: Jour. Boston Soc. Med. Sc., 1900, iv, 251; Jour. Exper. Med., 1901, v, 397.
64. Sauerbeck: Ergebn. d. allg. path. u. path. Anat., Wiesbaden, 1904, viii, 538.
65. Hansemann: Ztschr. f. klin. Med., 1894, xxvi, 191; Verhandl. d. Deutsch. path. Gesellsch. in Hamburg, 1901, p. 187.
66. Gutmann: Arch. f. path. Anat., 1903, clxiii, 493.
67. Karakascheff: Deutsch. Arch. f. klin. Med., 1907, lxxxii, 60.
68. Herxheimer: Arch. f. path. Anat., 1906, clxxxiii, 228; Orth's Festschr., 1903, p. 228; Deutsch. med. Wchnschr., 1906, p. 829.
69. Schmidt: München. med. Wchnschr., 1902, p. 51.
70. Ssobolew: Arch. f. path. Anat., 1902, clxviii, 91.
71. Opie: Disease of the Pancreas, Philadelphia, 1903.
72. MacCallum: Bull. Johns Hopkins Hosp., 1900, xx, 265.
73. Cecil: Jour. Exper. Med., 1909, xi, 266.
74. Visentini: Arch. f. Anat. u. Physiol., Physiol. Abteilung, 1908, Suppl. Band, p. 23.
75. Lombroso: Jour. de physiol. et de path. gén., 1905, vii, 3.
76. Zunz and Mayer: Mém. de l'Acad. roy. d. méd. d. Belgique, 1906, xvii, 7; cited by Hess.
77. Hess: Arch. f. d. ges. Physiol., 1907, cxviii, 536; Medizinisch-Naturwissenschaft, Arch., 1908, i, 161.
78. Pratt, Lamson and Marks: Tr. Assn. Am. Phys., 1909, xxiv, 266.

strength and the animals sometimes die of inanition. Our constant results are due to the skill with which the operation of completely separating the pancreas from the duodenum was performed by Dr. F. T. Murphy. It is a more difficult procedure than total extirpation of the pancreas, as is shown by the failures of many experimenters.

In a dog killed two months after the operation the pancreas was shrunken to a hard mass about 3 cm. long which consisted almost entirely of dense connective tissue. The remains of dilated ducts and acini in scattered areas were present, but no islands of Langerhans remained. The dog did not develop diabetes and hence the internal secretion, if produced at all, must have had its origin in the acini. In a cat which died fifty-three days after the ducts were occluded no islands could be demonstrated, but the protoplasm of many of the acinar cells had lost their characteristic staining properties and the cells resembled in appearance those of the islands in a normal gland. The altered acini, rich in vessels and surrounded by connective tissue, might easily have been mistaken for islands of Langerhans if all transitions from normal acini were not present in the same section. In a dog which died between five and six months after the operation the entire gland, except a small portion near the duodenum, was converted into fibrous tissue with acini and islands entirely destroyed. The dog did not develop diabetes, although the bit of pancreatin tissue remaining contained no islands of Langerhans.

These observations seem to be irreconcilable with the island theory. How can its supporters explain the absence of diabetes when all the islands are destroyed?

If the conclusions of Ssobolew, De Witt and MacCallum were correct and the islands remain intact after tying the ducts it would be difficult for the advocates of the island theory to explain the rapid fall in the limit of assimilation for glucose, which within three weeks in one of our experiments[42] was from 125 gm. to 65 gm. Furthermore, as the marked changes described occur in animals without diabetes it is improbable that slight lesions in the acini, islands, and blood-vessels interfere seriously with the internal function of the pancreas. The severe alterations in the islands found in many cases of diabetes are probably of etiologic importance, although they may be secondary to unknown changes in the metabolism. There is no proof that severe lesions in the acini may not be of equal significance. The islands may be anatomically independent of the acini and yet not physiologically independent. No facts have yet been brought forward to make untenable the hypothesis that the acini as well as the islands of Langerhans may under normal or pathologic conditions produce the pancreatic internal secretion. Neither the island theory nor the acinar theory, nor yet the theory that diabetes may be due to lesions in either acini or islands, explains the many cases of diabetes in which no change occurs in the pancreas. As is well known, diabetes in early life is especially severe, yet in 50 per cent. of the cases in individuals under 30 years of age Cecil[72] found the pancreas normal. It is possible that diabetes without lesions of the pancreas is due to functional changes in the organ, but such a conclusion is pure conjecture, and savors of "learned ignorance."

If the views of Cohnheim[17] and Taylor[79] are correct it may be that the cause of the disease in these cases is not in the pancreas, but is due to a loss in the mass of the muscular ferment, or some disturbance in the relation between the pancreatic "activator" or "zymoexcitor" and the muscular ferment. It is probable that the disturbance in metabolism that occurs in pancreatic diabetes is more complex than present-day theories indicate.

79. Taylor: Author's abstract of paper read before Assn. Am. Phys., May, 1910.

SUMMARY

Despite opposing theories and conflicting observations in regard to the relation of the pancreas to diabetes some facts have been definitely ascertained.

The total removal of the pancreas always leads to a fatal diabetes.

Atrophy of the pancreas produced by excluding all the pancreatic juice from the intestine is associated with a marked decrease in the limit of assimilation for sugar.

Transplantation of a portion of the pancreas prevents the development of diabetes when the rest of the gland is extirpated.

Lesions of the islands of Langerhans are found in most cases of diabetes. They are usually associated with changes in the acini.

In the progressive atrophy which follows the occlusion of all the pancreatic ducts in dogs and cats both islands and acini are gradually destroyed.

All the islands may disappear without diabetes resulting.

The conclusion is justified that the pancreas has an internal function concerned with the metabolism of sugar.

The nature of this function, the relation of the islands of Langerhans to the acini, the significance of histologic changes in both structures, these and other problems still await solution.

313 Beacon Street.

[THE PRECEDING ARTICLES ARE PART OF A SYMPOSIUM ON DIABETES WHICH IS CONCLUDED FURTHER ON IN THIS ISSUE.]

HAIRY OR BLACK TONGUE*

M. L. HEIDINGSFELD, M.D.

Professor of Dermatology at the University of Cincinnati; Dermatologist to the Cincinnati Hospital, etc.

CINCINNATI, O.

The subject of hairy or black tongue has engrossed a varied degree of attention in dermatologic literature. A comparatively large number of the cases, chiefly from French and English sources, were reported at the time of the discovery and early mention of the affection. Brosin[1] recorded some forty odd cases reported prior to 1888. The next large increment of cases occurred when investigators first took issue in regard to its parasitic or non-parasitic nature, which has remained a more or less unsettled point of contention to the present day. Relatively few cases have been reported in recent years, not so much because the affection is possibly more rare or exceedingly infrequent as because little additional information could be offered regarding its etiology, pathology and treatment. There are scarcely a hundred cases recorded in the literature at the present time, and if the spurious and unauthenticated cases were eliminated the remainder would probably not total much more than half that number. The earliest report of the affection

* Read in the Section on Dermatology of the American Medical Association, at the Sixty-First Annual Session, held at St. Louis, June, 1910.

1. Brosin: Monatsh. f. prakt. Dermat., 1888, vii, No. 1, Ergänzh., p. 5.

probably emanates from Rayer,[2] who in 1835 described, under the name *discolorations pigmentaires*, several cases of black discoloration of the dorsal surface of the tongue. Eulenberg[3] in 1853 described a black-coated tongue (*eine schwarze Zungenbelag*) in a 2-year-old child affected with diarrhea, which persisted for several months. He first called attention to involvement of the filiform papillæ, a feature more carefully elaborated later by Gubler.[4] St. Germain[5] in 1855 reported some transient cases of short duration in debilitated individuals, under the name *nigrité de la langue*. Raynaud[6] in 1869 independently described several cases as a new affection, and first ascribed to the condition a parasitic cause. He pictured mycelia and spores, unlike any previously described. As soon as Raynaud attributed a parasitic etiology interest in the affection materially increased; Gallois[7] was unable to confirm Raynaud's observations, and Richter[8] states that he had observed the tongue epithelium to develop into thick, black, cylindrical "turf" (*Rasen*) without ever being able to discover Raynaud's fungus. Féréol[9] likewise found no evidence of spores in his case, and stated that their presence in hairy tongue must be of accidental rather than etiologic character. He considered the hypertrophy of the filiform papillæ the essential pathologic feature, and called the affection *l'hypertrophie épithéliale filiforme*. Within a few years Laveau,[10] Lancereaux,[11] and Dessois[12] reported some cases with which they confirmed Raynaud's parasitic etiology. Dessois attempted to confirm the parasitic nature of the affection by inoculation experiments on his own tongue, which, however, proved negative in character. He named the affection *glossophytie*. Rayer reported that not only were inoculation experiments negative, but morphologically similar spores were present on normal tongues. Pellarez,[13] a Spaniard, erroneously regarded the condition as a vegetating growth and Salter[14] ascribed the discoloration to an anomaly of pigmentation. Butlin[15] believed the fungi normally found in the mouth could, under special conditions, impart a black discoloration to the coating of a tongue. Schech[16] described the discoloration under the microscope as light to dark brown and diffusely distributed over the hairs, without being interspersed with sharp, distinct accumulations of pigment or areas free from pigment. The hairs consisted of thickly crowded masses of long, thin epidermic cells, with a marked tendency to bristle and branch at the borders. They set forth the greatly enlarged, cornified and pigmented filiform papillæ. A remarkable feature was the absence of fine granular masses of cocci, bacilli and leptothrix, which are a part of the normal coating of the tongue. Schech found no evidence of fungi in support of Dessois and Sell and was obliged to retract his former expressed views regarding its mycotic character. Brosin[1] regarded the affection as a hypertrophy of the papillæ filiformes, with abnormal pigmentation and keratosis of the affected tissue. This view was supported by Rosenberg,[17] Rydygier,[18] Wollerand,[19] Surmond,[20] and others, and their studies revealed the presence of many forms of micro-organisms of incidental and non-pathogenic significance.

Those who have confirmed the parasitic nature of the affection in more recent years are Roth,[21] who found a micro-organism abundantly present in two cases, to which he attributed the discoloration, and called the affection a keratomycosis. Dinkler[22] disclosed the presence of a filiform bacillus, but was unable to cultivate it. Lake[23] detected the presence of round spores. Ciaglinski and Hawelke[24] and Senziak[25] were able to cultivate a black fungus to which they attributed etiologic importance, but only at room—not at body—temperature. Rostowjew[26] describes in his two cases, in addition to the ordinary mouth bacteria, a peculiar cladothrix, the cultures of which were black. Much infectious significance is attributed by Rostowjew to the occurrence of the affection in husband and wife. Gottheil[27] illustrates the spores in his case, which showed only a black discoloration of the tongue, without a coat of hairlike prolongations. Lucet[28] describes the presence of small round or oval double contoured, highly refractive bodies, with hyaline or finely granular contents. They stained with compound solution of iodin and grew luxuriantly on 5 per cent. glucose agar at 37 C. Inoculation experiments on rabbit tongues were negative. Gottheil named the fungus *Saccharomyces linguæ pilosæ*. Gaston and Laselet[29] believed that the cause of the black discoloration was a fungus which they successfully cultivated. Guéguen[30] is the latest observer to attribute this affection to a hitherto undescribed organism, the *Oospora lingualis*. Equally large is the number of present-day observers and investigators, who either ignore or regard as untenable the theory of the parasitic origin of the affection and attribute it to other causes. Levisseur[31] attributed the cause in his case to use of silver nitrate and chromic acid in the treatment of syphilitic plaques. Schnabel[32] and Schourp[33] regard the affection as a common one among syphilitics, dyspeptics and tobacco users. Audry and Dalous[34] and Hallopeau[35] have observed the affection in cases of Darier's disease. Mourek,[36] in his carefully reported and investigated case, states that microorganisms were found sparingly and gave no evidence of anything of characteristic significance. The bacteriologic investigation was of negative character. He be-

2. Rayer: Traité théorique et pratique des maladies de la peau, 1835, iii, 573, article Nigrité.
3. Eulenberg: Arch. physiol. Heilk., 1853, xvi, 490.
4. Gubler: Bouche (Séméiologie) Dict. de Dechambre, 1869; quoted by Brosin: Note 1.
5. St. Germain: Compt.-rend. Acad. d. Sc., 1855, March 28.
6. Raynaud: Séance de la Soc. med. d. hôp., Feb. 26, 1869.
7. Gallois: Séance de la Soc. de Biologie, Aug. 7, 1869.
8. Richter: Krankenmachende Schmarotzepilze, Schmidt's Jahrb., 1871, cli.
9. Féréol: Séance de la Soc. méd. d. hôp., June 25, 1875.
10. Laveau: De la langue noire, Thèse de doctorat, Paris, 1876; quoted by Brosin, Note 1.
11. Lancereaux: Séance de la Soc. méd. d. hôp., Dec. 8, 1876.
12. Dessois: De la langue noire, Thèse de doctorat, Paris, 1878; quoted by Brosin, Note 1.
13. Pellares: Gaz. méd. de Paris, 1879, No. 52 (abst.).
14. Salter: Todd's Encyclopedia of Anatomy and Physiology, 1852, No. 6.
15. Butlin: Diseases of the Tongue, 1885, p. 31.
16. Schech: München med. Wchnschr., 1887, No. 14, April 5.
17. Rosenberg: Quoted by Mourek: Arch f. Dermat. u. Syph., 1894, xxix, 369.
18. Rydygier: Beitrag zur seltenseren Erkrank. der Zunge, Arch. f. klin. Chir., 1891, No. 41, p. 767.
19. Wollerand: Sur la langue noire papillaire, Virchow's Arch. f. path. Anat., xxv.
20. Surmond: La langue noire, Gaz. d. hôp., 1891.
21. Roth: Wien. med. Presse, 1887, p. 935.
22. Dinkler: Ein Beitrag zur Pathologie der sogenannten Schwarzen Haar-Zunge, Virchow's Arch. f. path. Anat., cxviii.
23. Lake: Black Tongue, Brit. Med. Jour., 1891, p. 946.
24. Ciaglinski and Hawelke: Beitrag zu einer seltenen Erkrankung der Zunge, Ztschr. f. klin. med., 1893, xxii, 626.
25. Sendziak: Beitrag zur Etiologie der sogenannten Schwarzen-Zunge, Monatsh. f. Ohrenh., 1894, xxviii, 112.
26. Rostowjew: Hospitals, Botkin, 1896, No. 8.
27. Gottheil: Arch. f. Pediat., 1889, p. 255.
28. Lucet: Arch. de parasitol., May 20, 1901.
29. Gaston and Laselet: Tr. de Soc. Franç. de dermat. et de syph., March 18, 1909, xx, No. 5.
30. Guéguen: Arch. de parasitol., 1909, xii, No. 8.
31. Levisseur: New York State Jour. Med., 1899, xlix, 42.
32. Schnabel: Haar-Zunge, Inaug. Dissert., Leipzig, 1904.
33. Schourp: Monatschr. f. Harnkr. u. sex. Hyg., iii, No. 2.
34. Audry and Dalous: Jour. de mal. cutan., 1904, xvi, 801.
35. Hallopeau: Ann. de dermat. et. de syph., 1896, series 3, vii, 744.
36. Mourek: Arch. f. Dermat. u. Syph., 1894, xxix, 369.

lieved the process is a hyperkeratosis and the discoloration the result of contact with food and other extraneous products. The epithelial cells cohered and became mechanically discolored, as in other keratotic affections of the skin. Vollmer[37] states that though the etiology and mode of production is obscure, he is of the opinion that syphilis, mercurialization, strong disinfectants, tobacco, etc., are predisposing factors. He regards the parasitic etiology as untenable.

REPORT OF CASES

CASE 1.—On May 25, 1909, Mr. A. D., aged 85, was referred to my attention for a peculiar discoloration of the tongue, which was the site of severe subjective pain and discomfort. Examination revealed a brownish-black discoloration extending anteriorly from the circumvallate papillæ to within almost one inch of its tip, and one-half inch of the right lateral border. The affected area was irregularly elliptical in outline, situated for the most part on the right side of the tongue, but slightly transgressed the median line at its middle third. The patch was black at its center with borders that gradually faded from brownish-black to yellowish-brown. The remainder of the tongue and the mucous membranes of the mouth were bright red and normal in appearance. Salivation was very marked, and the patient complained severely of intense pain in the tongue, which was also referred to the ears. The patch was thickly covered with a soft, felt-like coating of hair-like processes, which on more careful examination and inspection were found to be inextricably interwoven and matted together, in the manner of "a field of grain laid low by storm and wind" as previously described by Gubler, Raynaud, Stokes and Lake. An abundance of long hairy filaments, some of which measured ¾ of an inch in length, could be readily removed with thumb forceps. The patient, an intelligent German, stated that his personal attention was first directed to his tongue, some two months prior to the time of the examination, by pain and a sense of soreness in the tongue, and the black discoloration was then in evidence in its present unchanged form. No history of its incipiency or probable duration was obtainable.

Biopsy.—On May 28 a biopsy was made for histologic study. Patient was observed daily. The pain became more intense and salivation more marked. On June 3 a marked swelling manifested itself at the left lateral border of the tongue near its middle third and remote from the hairy involvement; the mass, which was deep-seated in origin, was firm and hard in consistence, irregular in outline. The lesion was diagnosed as an epithelioma and the case referred to a surgeon. The subsequent history confirmed this diagnosis. As soon as ulceration took place the patient experienced some sense of relief from his distressing pain. On Feb. 15, 1910, the bed-ridden patient was still alive, although the disease had made great inroads on his previous fairly robust constitution; death eventually took place March 5, 1910. The complicating malignant growth in this case was, without question, a mere coincidence, and has its analogue in a case of a 49-year-old brickmaker, reported by Lediard, who had an epithelioma at the tip of the tongue remote from the pathologic hairy area.

CASE 2.—R. K., aged 19, was first seen in consultation April 6, 1905. Patient stated that three months previously he noted an abnormal sensation in the tongue, resembling the presence of a foreign body on the surface which could not be dislodged. On looking into a mirror he noted for the first time the black discoloration, became alarmed and forthwith brought the condition to the attention of his physician. The examination revealed an intense blackish discoloration of the tongue, with borders imperceptibly fading to brownish-yellow, occupying a triangular area, extending from the circumvallate papillæ anteriorly along the median dorsal surface of the tongue almost to its tip and lateral borders. The same soft felt-like coating of matted hair-like processes was observed as in the previous case, and a specimen was removed and preserved in alcohol for histologic examination. Pain and distress were entirely absent, and there were no subjective symptoms except as already noted. Patient was last observed in Jan. 15, 1910, and during the intervening five years no appreciable change was detected in the clinical appearance of the tongue. Patient persistently refused a biopsy, but readily permitted the removal of large numbers of hairy processes, some of which measured fully ¾ of an inch in length. Syphilis was absent and there was no history of drug-taking, or the use of caustic or astringent applications.

In addition to these two well-defined clinical cases it has been my privilege to observe several cases of less marked character in connection with conditions of general dermatologic interest. The patients were, almost without exception, unaware of or at least indifferent to the manifestations on the part of the tongue, which were revealed merely by process of routine examination, and doubtless would have been dismissed with passing notice had not the unusual interest of the condition been understood. In most cases there was at least a moderate amount of felt-like covering, of hairy growth, in addition to the brownish or blackish discoloration, and hairs from ⅛ to ¼ of an inch could be readily removed and floated in water or alcohol. In some cases there was mere discoloration without an associated hairy growth, as reported by Gottheil, Stokes, Ciaglinski and Hewelke and Sendziak. This discoloration was soft, mushy in character, and could be freely but somewhat incompletely removed by light scraping. The cases occurred for the most part in early syphilitics and were observed in the process of the examination of the tongue for the presence or absence of mucous plaques, or the coated or non-coated state of the tongue in non-syphilitics. All of the cases occurred in males. Most, but not all, of the syphilitics were using at the time astringent and antiseptic mouth lotions. The patches disappeared, however, in some of these cases, in spite of the persistent use of the astringent antiseptic mouth lotions.

One patient, affected with gonorrhea but not with syphilis, was taking sandalwood oil internally, but the patch persisted for some time after the internal administration of the oil was withdrawn. It disappeared entirely after a lapse of several months.

In two cases syphilitic infection was of long standing; one patient had an extensive leucoplakia of the tongue and these areas were free from the yellowish-brown discoloration, which occupied an irregularly oval area near the center, anterior to the circumvallate papillæ. Most, but not all, of the cases occurred in patients who used tobacco immoderately. Dietary indiscretions and gastro-intestinal disturbances were in evidence in the majority but not in all of the cases. The patches were evanescent and transient in all the cases, fading or disappearing without treatment and attention, and occasionally relapsing from untoward local or general influences. These cases lacked the clean-cut clinical characteristics of the first two well-defined cases, in which the color was more intense, the hairs longer, more numerous and interwoven, the patches thicker, more fur-like and sharply defined and more persistent and stable in character. I am inclined to believe that several of the cases reported in the literature belong to this second class of—if I may be pardoned the term—spurious or pseudo cases.

Microscopic Examination.—The microscopic appearance of the hairy-like filaments was fairly constant, when compared with each other and with those described in the literature. Specimens from the pseudo—or spurious—cases could not be differentiated microscopically, except for length and thickness, from those of the two well-defined ones. Specimens unstained and stained by various methods were examined; the unstained specimens, for the most part, showed a more regular and bet-

37. Vollmer: Arch. f. Dermat. u. Syph., 1898, xlvi, 13.

ter preserved outline. The color of the unstained specimens is a diffuse yellowish-brown—as already noted by Scheeh, Mourek, and others.

The outline is an elongated cylinder, hair-like in general appearance. The resemblance to a hair is accentuated in many instances by the presence of a zone analogous to the medullary canal. In many there are several of these zones of varying color intensity, and on close examination they are found to owe their presence to the fact that a single filament is often composed of two or more closely united shafts. These shafts are united the greater part of their entire length; they become separate and distinct from each other a short distance from the distal extremity, imparting a peculiar tuft-like appearance, not altogether unlike that observed in a pineapple (Fig. 1, A). Occasionally one of the united shafts will become dissociated at some more median point, and impart an appearance not altogether unlike that of the leaf to a stalk of Indian corn (Fig. 1, D). The resemblance to Indian corn becomes more marked if there are several lateral dissociations.

Lateral deviations have been noted by Scheeh and other early observers. On closer examination under higher magnification the filaments are observed to be composed of thin, non-nucleated, stratified, closely superimposed epithelial cells. Their cornified, non-nucleated character can be confirmed if the filaments are macerated with gentle heat in a solution of potassium hydroxid. The individual cells are superimposed in such a way as to produce serrated borders; the serrations are constantly directed downward, producing a peculiar tesselated effect, which can be compared to the scales on the surface of a pineapple. This imbricated character has been frequently noted in the literature; it is not marked enough to conjure up the resemblance of a row of inverted funnels, as described by Brosin, nor is their order, as he states, ever reversed, so that they partake of the appearance of a harpoon or trident. For similar reasons the spike-like appearance or resemblance to the head of a wheat-stalk described by Mourek, is not to be discerned; surface indentations were not observed to recall the "corncob" effect described by Levisseur. The serrations at the border are directed toward the base, and away from the rounded and cleft extremities constantly enough to permit a ready differentiation of the distal from the proximal extremity.

In well-stained specimens the filaments were observed under oil-immersion to be thickly studded with masses of cocci, which morphologically resembled the common pus germs. They were present in exceedingly large numbers, were intracellular and extracellular, and often in such density as to resemble pure cultures of the common staphylococci. Larger and more deeply stained cocci and diplococci were interspersed here and there together with bacilli, leptothrix, and various forms of organisms commonly found in the mouth. In addition to the various stained micro-organisms, a few large round, highly refractive, double contoured bodies, some larger, some smaller, often in such proximity as to impart a budding character, were observed here and there in most of the specimens examined. They were not numerous enough to assume pathogenic importance, and to all appearances their presence partook of a coincidental character. Some unrecognizable fungi and micro-organisms were also observed; the micrococci, however, predominated greatly over all other forms.

Culture Experiments.—Culture experiments were attempted in both genuine and spurious cases. The affected surfaces were carefully sponged with ether and 5 per cent. glucose agar; nutrient agar and blood-serum were carefully inoculated with removed filaments and platinum loop inoculations from the affected area. Some of the cultures were kept at 38 C.; others at room temperature.

The cultures uniformly remained sterile or became the seat of innumerable, small, glistening, white, superficial colonies, which morphologically and microscopically resembled in every particular *Staphylococcus albus*. No fungus was evident even on prolonged standing in any of the cultures examined.

Histology.—A biopsy was obtained only in Case 1, and the histologic report with accompanying illustrations, is the first, to my personal knowledge, to be recorded for the affection. Under low power the filaments when cut vertically and longitudinally to their long axis, are observed to reach upward and forward in irregular parallels (Fig. 2). Many of the intertwined filaments are cut transversely and obliquely. The filaments preserve for themselves a feather-like appearance. When cut transversely to their long axis their continuity is preserved only a short distance and most of them appear as small, round or oblique fragments. The filaments can often be directly traced to their origin from papilla-like projections of the stratum corneum. The stratum corneum elongations promptly take on a fringe of serrated, more loosely arranged and deeper staining cells; they often coalesce within a short distance of their proximal extremities with one or more adjacent filaments, to form double, triple, or quadruple filaments. Acanthosis is another marked pathologic feature. The rete and the papillæ are considerably hypertrophied, and there is a very extensive downward prolongation of almost every fourth, fifth or sixth interpapillary process of the rete Malpighii. The lower layer of columnar cells is sharply defined, well preserved and in a state of active proliferation. The pars papillaris and subjacent tissue, are entirely devoid of any marked pathologic change save a diffused, mild infiltration of inflammatory products, the distribution of which is limited almost exclusively to the pars papillaris.

One of the most striking pathologic changes, and possibly second in importance only to the filaments, is the formation of papilla-like bodies within the rete Malpighii (Fig. 3). They are differentiated from the rete, in which they are situated, by a well-defined layer of more deeply stained columnar basal cells. Their well-defined interpapillary spaces are devoid of fibro-connective tissue and filled with epithelial cells of the rete. They are further differentiated from normal papillæ by their diminutive type. If cut obliquely or on cross section they partake of the appearance of epithelial nests (Fig. 4); and it is not unusual to note six to twelve or more of such nests clustered in a circle. If cut longitudinally they can be traced directly to the surface to points where the filaments take their origin (Fig 5). Having assumed that these intra-epithelium-placed papillæ are the origin of the hairs, I have termed them "epithelial founts."

The stratum corneum is more or less imperfectly preserved. In some places it is of normal thickness, structure and staining properties and covers a fair extent of surface. In places it is almost entirely lacking, and, when present, rises perpendicularly from the surface to form the proximal extremities of the hair-like filaments. Where it is preserved, it is often covered or partially covered with a thick layer of partially stratified, nucleated epithelial cells. Groups of degenerated cells are occasionally observed at the tips of the papillæ, or in the epidermis near the papillary border (Fig. 6). These cells are often surrounded by a single layer of endothelial cells; their yellowish color, small homogeneous appearance, angular outline, with interspersed darkly-stained lymphocytes, indicate that they are blood accumulations. Inasmuch as such accumulations have been observed and recorded in the corneous substance of cutaneous horns by Joseph and others, the analogy is plausible. These "blood cavities" and the rete-papillary border occasionally contain large rounded, hyaline or faintly granular, double culture bodies, which are apparently cell degenerations, rather than pathogenic spores, although they bear a morphologic resemblance to spores to which pathogenic importance has been attributed (Fig. 7). They are often embedded in a mass of large, edematous, vacuolated cells situated at the papillary border of the epidermis, which resemble the degenerative cell changes in Paget's disease.

The pathology cannot be dismissed without a brief comparative reference to cutaneous horns, ichthyosis hystrix, leptothrix and hair. The histopathologic similarity which some of these affections bear to hairy tongue is remarkable to the degree with which their clinical characteristics are dissimilar; and *vice versa*, the affections which preserve the greatest degree of clinical resemblance show the least histopathologic resemblance. Cutaneous horns, which have clinically little or nothing in common with hairy tongue, have much in common pathologically. They are composed of masses of corni-

fied, or at least partially stratified, epithelial cells, arranged with wonderful cohesion into dense elongated columns, row after row separated by valley-like clefts, resembling the medullated canals of hair. Intra-epithelial spaces containing blood are also observed. The origin is purely epidermal, and the base rests on and apparently is developed from intra-epithelially placed papillæ and interpapillary processes resting above the area of the true papillæ, and true interpapillary processes, unless the latter, have disappeared from pressure atrophy. The former papillæ and inter-papillary processes correspond to the intra-epithelially placed "epithelial founts" of hairy tongue.

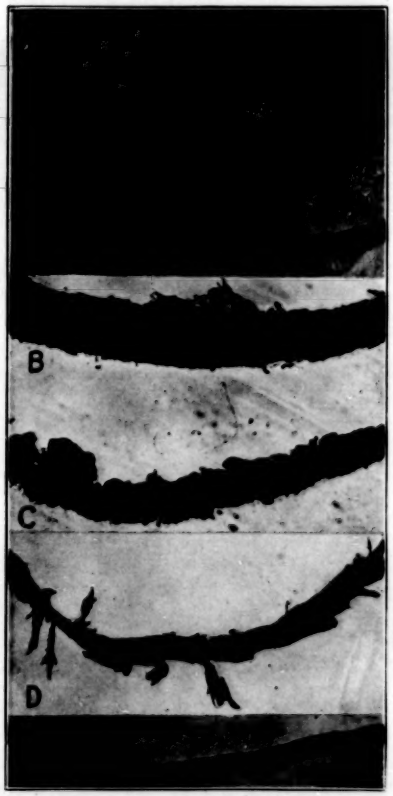

Fig. 1.—Specimens from patient with hairy or black tongue: A, separated from each other at the extremity; appearance, tuft-like; a single hair composed of several closely united shafts; B, stained hair of considerable size; C, unstained filament coated with loose masses, composed largely of micro-organisms; D, hair resembling in appearance a stalk of Indian corn; E, one-half of hair measuring ¾ inch; tenfold magnification.

Ichthyosis hystrix, which preserves possibly more clinical than histopathologic resemblance to hairy tongue, preserves little histologic similarity except a marked hyperkeratosis. The hyperkeratosis, however, is arranged parallel rather than perpendicular to the surface and the spinous processes are the result of keratotic accumulations, spread irregularly over the surface of four or five hypertrophied papillæ. The inflammatory exudate is more perivascular, less diffused in character and more circumscribed to the capillary vessels of the pars papillaris.

Fig. 2.—Hair-like filaments cut vertically and longitudinally to their long axis. Many intertwined filaments cut obliquely and transversely. Filaments reach upward and forward in irregular parallels.

Fig. 3.—Papilla-like bodies within the rete Malpighii; probable origin of hair-like filaments.

Leptothrix, which has little or nothing clinically in common with hairy tongue, shows a striking resemblance under the microscope, in that the affected hairs are coated with an accumulation of loosely adherent cells and detritus, containing myriads of micrococci and other micro-organisms. The morphologic resemblance, under the microscope, of hair affected with leptothrix to the filaments of hairy tongue is very striking. An additional point of resemblance is the discoloration, which

in leptothrix is often yellow or red, and in hairy tongue, black, to brownish-yellow. Pathogenically there can be little in common in the two affections. The *gross* clinical resemblance which filaments bear to hair is striking enough and gives the affection a misnomer. Remarkable in many of its microscopic features, the resemblance is microscopically and histopathogenically a paradox that requires no comment. In origin, development, essentials of structure and pathogenesis they naturally share nothing in common with hair.

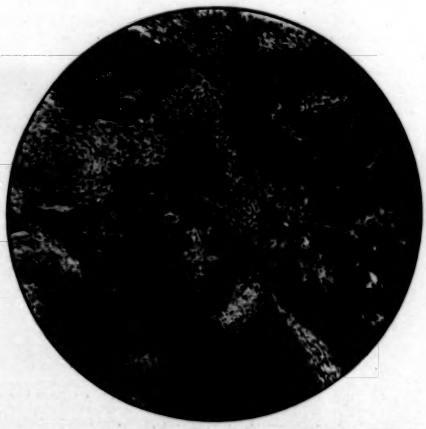

Fig. 4.—The same papilla-like bodies cut transversely and imparting the appearance of epithelial nests clustered in circles.

Fig. 5.—Superficial origin of the hair-like filaments.

GENERAL DEDUCTIONS

Hairy tongue can be conveniently divided into two general classes: (1) true, idiopathic, or genuine cases, characterized by well-defined stable, black-brown or yellow-brown, thick, soft, fur-like patches covered with densely intertwined hair-like filaments, easily measuring from ¼ to ½ inches in length; and (2) false, pseudo or spurious cases, characterized by thickish, yellow-brown or greenish discolorations, of unstable evanescent character, covered with a soft mushy detritus, occasionally containing short filaments measuring ⅛ to ¼ of an inch in length. The true cases owe their origin to some anomaly of development, probably of congenital nature, in the sense that the germinal products from which they are developed are present from birth, but do not undergo growth and developmental changes until early adolescence or some later period in life. Such an

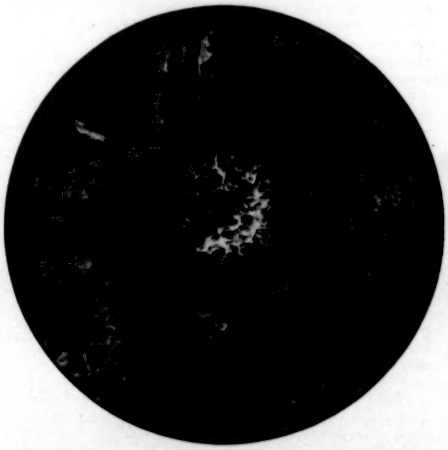

Fig. 6.—Blood cavity strongly magnified, showing its intra-epithelial position. Cavity is lined with a layer of endothelial cells.

Fig. 7.—Small blood cavity within the epidermis with areas of edematous and degenerated epithelial cells at the rete papillary border.

origin is assumed and very generally conceded for moles, vascular, pigmented papillomatous and unilateral nevi, cutaneous horns,[38] etc., and can be extended with equal propriety to this affection, all the more since the histopathology reveals an anomaly of development (whose striking similarity to cutaneous horns has already been alluded to) rather than any evidence of an infectious or inflammatory nature. An anomalous development and congenital origin is further evidenced by the fact that the true, idiopathic or genuine cases are of stable character, and remain unchanged in size and form for indefinite periods, and localized to definite areas. Such would not likely be the case if they were of infectious origin or of inflammatory character resulting from local or general causes.

The pseudo or spurious cases are unstable and evanescent and probably owe their origin to such local or general irritating and infectious causes as tobacco, antiseptics, astringents, syphilis, etc. The presence of the filaments is probably due to an inflammatory hypertrophy of the papillæ filiformes. These cases in varying degree of intensity can be frequently noted, particularly in the early stages of syphilis, and constitute no uncommon affection. The diagnosis can be easily confirmed by removing some of the grumous coating of discolored tongues by means of fine forceps, and floating it in clear water or alcohol. The hair-like filaments can then be readily seen with the naked eye. The majority of cases recorded in literature probably belong to this group. A parasitic origin for the affection could not be established on either clinical, histopathologic or bacteriologic grounds; it does not develop or spread clinically like a parasitic affection. Inoculation experiments were negative in the sense that the affections could not be distributed to other unaffected parts of the tongue. It failed to spread to the abrasions and excoriations of an intercurrent cancer of the tongue. The histopathology reveals chiefly anomalous structural changes, and the absence of the marked inflammatory changes generally incident to chronic and acute infectious and localized irritations. The fundamental abnormality is the presence of abnormal papillæ, and interpapillary processes or "filament founts" situated within the epidermis, from which the abnormally elongated, stratified and keratosed filaments trace their direct origin. Some of the basal cells at the papillary-rete border showed vacuolated and edematous change, to which, however, no special significance could be attributed. The filaments were freely studded with micro-organisms which resembled *Staphylococcus albus* morphologically, to which likewise no special significance could be attached. A few double-contoured bodies were occasionally observed among the filaments and in the deeper structures, to which no important significance was attributed. The bacteriologic findings were, as already stated, sufficiently negative in character to preclude, in my opinion, a parasitic etiology for the affection.

19 West Seventh Street.

Ocular Chancre.—Chancres of the eyelids may be palpebral or conjunctival. A chancre situated on the ciliary border of the eyelid may be mistaken for a stye. Conjunctival chancre is more often situated on the palpebral than on the ocular conjunctiva, and generally causes conjunctivitis, chemosis, and eversion of the eyelid. Chancres situated at the outer angle of the eye cause enlargement of the preauricular gland; chancres of the inner angle of the eye cause enlargement of the submaxillary glands.—C. F. Marshall, in the *Practitioner*.

38. Philip: Monatsh. f. Prakt. Dermat., 1904, xxxix, 630.

THE COMPARATIVE PATHOLOGY OF HYPERPLASTIC AND SUPPURATIVE ETHMOIDITIS *

ROSS HALL SKILLERN, M.D.
PHILADELPHIA

Last year, when the subject of hyperplastic ethmoiditis, in contradistinction to the suppurative type, was presented before one of our laryngologic societies, the question was raised as to whether these conditions were not

Fig. 1.—Chronic hyperplastic ethmoiditis; processus uncinatus, early stage; beginning polypoid hypertrophy on free border which forms portion of hiatus semilunaris; internal or nasal portion not yet affected.

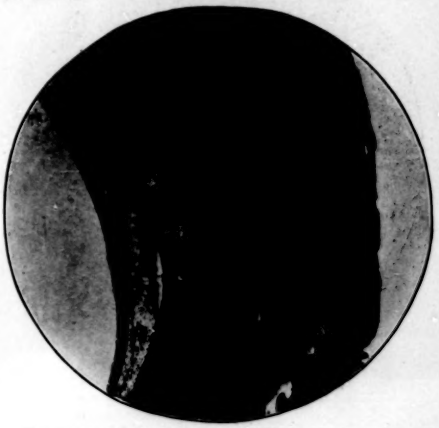

Fig. 2.—Chronic hyperplastic ethmoiditis, later stage. Considerable round-cell infiltration through the polypoid hypertrophy; great infiltration around the glands and blood vessels; medullary spaces infiltrated.

* Read in the Section on Laryngology and Otology of the American Medical Association, at the Sixty-first Annual Session, held at St. Louis, June, 1910.

* From the McManes Laboratory of Pathology, University of Pennsylvania.

identical, or that one was merely a sequela or a complication of the other, as the case might be. It is my intention to bring before you to-day the microscopic pathology of these two conditions and show that the ethmoidal structures and their components are, under certain conditions, dissimilarly affected, and, indeed, often in diametrically opposite ways pathologically. Unfortunately for the argument of our contentions these two conditions can and often do occur simultaneously; i. e., a chronic hyperplastic ethmoiditis may become infected, thus giving us the picture of suppurative ethmoiditis with polyposis. The old question as to the precedence of the polyps of the secretion is, of course, clear in these cases. That the polyp formation in hyperplastic ethmoiditis may occur entirely dissociated from any purulent secretion, past or present, can only be substantiated by the veracity of the patients who have come under observation presenting this form of disease.

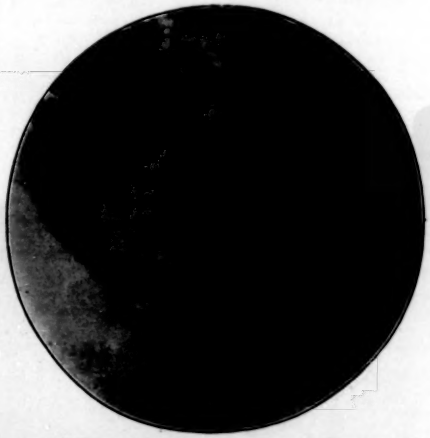

Fig. 3.—Chronic hyperplastic ethmoiditis (end of middle turbinate). Beginning polypoid hypertrophy at extreme end; round-cell infiltration practically absent; ciliated epithelium not affected.

Fig. 4.—Chronic hyperplastic ethmoiditis (base of ethmoidal capsule). Advanced changes; intense round-cell infiltration in basement layers and around glands and blood vessels; periosteum also affected.

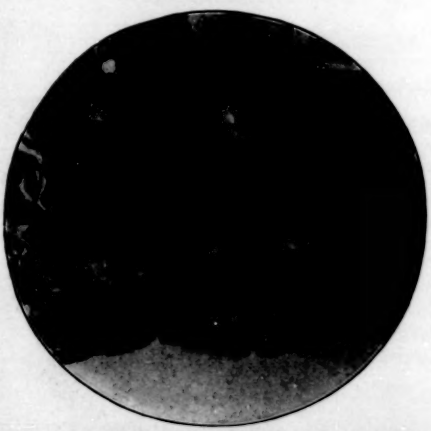

Fig. 5.—Chronic suppurative ethmoiditis (base of ethmoidal capsule). Advanced changes; intense fibrous tissue formation extending from periosteum outward enclosing vessels and glands and reaching almost to basement membrane; moderate round-cell infiltration in outer layers; beginning atrophy of glands.

Fig. 6.—Chronic hyperplastic ethmoiditis (medullary spaces, base of ethmoid). Hyperemia of entire contents of medullary spaces; proliferation of endosteum; veins distended with blood; lymphatic vessels distended; fibrous tissue formation around arteries.

The discussion as to the relation of polyp formation to empyema, particularly that of precedence, can only be referred to at this place; however, we have all seen empyemas without a vestige of polyp formation, and, on the other hand, polyps springing from the ethmoid region with no traces of pus. The latter class is the one

to which objections seem to have been raised as to the presence of previous suppuration, and on this point we must of necessity rely on the veracity and understanding of our patients.

Briefly reviewing the macroscopic pathology of hyperplastic ethmoiditis, it may be defined as a polypoid inflammation of both the lining and external mucous membrane of the ethmoid cells, which may or may not present free polyps hanging from the ethmoid capsule. It is primarily never associated with a purulent secretion, but rather one of a thin, watery consistency, its profuseness being in direct relation to the severity of the disease (area of tissue involved).

Empyema of the ethmoid cells is characterized by a more or less profuse, constant, purulent secretion, often accompanied by crust formation.

There is no question that many cases of chronic empyema occur without a vestige of polyp formation, and *vice versa*. One can go still further and state that typical empyema of the ethmoid labyrinth runs its course without polyp formation and that simple hyperplastic inflammation runs its course without the formation of purulent secretion. There then remains the combined process, polyp formation with empyema. According to

Fig. 7.—Chronic suppurative ethmoiditis. Changes in submucous tissue; considerable round-cell infiltration; marked atrophy of glands; beginning fibrous tissue formation.

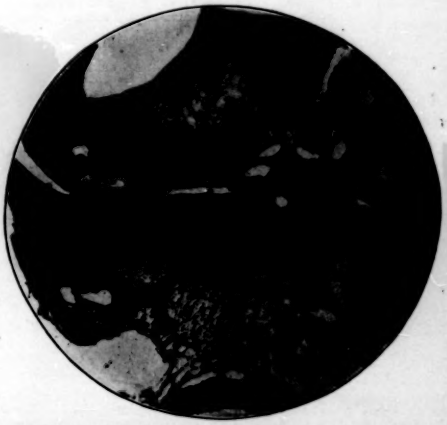

Fig. 8.—Chronic hyperplastic ethmoiditis. Polypoid formation in two separate and distinct cells; beginning atrophy of glands in one cell; blood vessels dilated but empty; medullary spaces and bone apparently normal.

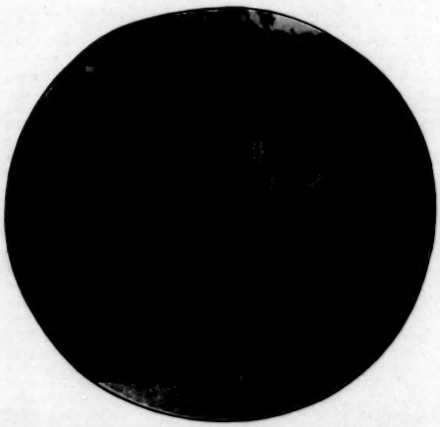

Fig. 9.—Chronic suppurative ethmoiditis. Marked fibrous tissue formation with obliteration of vessels and glands; apposition or new bone formation clearly marked around old bone.

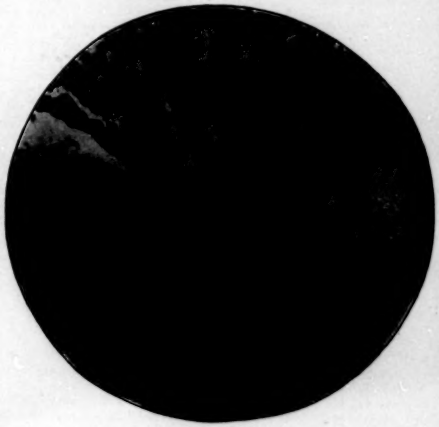

Fig. 10.—Chronic hyperplastic ethmoiditis with secondary empyema. Constriction of a polyp at its neck; below constriction round-cell infiltration and polypoid hypertrophy, glands dilated, blood-vessels obliterated; ciliated epithelium unchanged. Above constriction, fibrous tissue formation, glands atrophied; metamorphosis of ciliated epithelium into squamous.

Uffenorde the formation of purulent secretion is the result of secondary infection and should be viewed as such, being accessory to the hyperplastic condition. The microscopic differences are not so clearly marked, although certain individual peculiarities may always be noted.

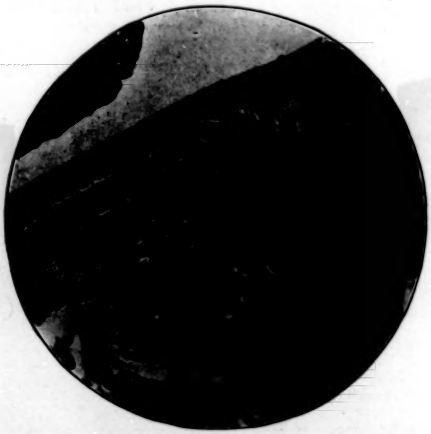

Fig. 11.—Chronic hyperplastic ethmoiditis with secondary empyema. Base of polyp, intense fibrous tissue formation; glands and vessels atrophied; peculiar new bone formation forming finger-like projections from the old bone.

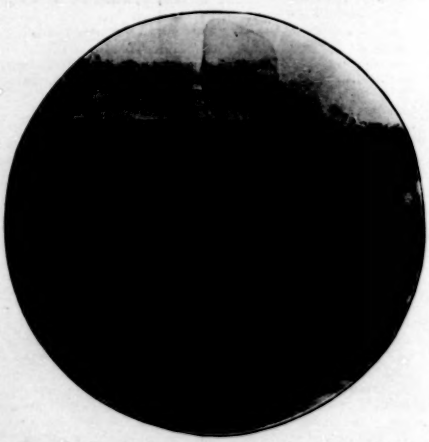

Fig. 12.—Chronic hyperplastic ethmoiditis. Advanced bone changes, marked osteoporosis or erosion of bone in conjunction with previously mentioned advanced changes in surrounding tissues.

These pictures are naturally not absolutely complete, as it requires a large number of microscopic fields to demonstrate every condition which is present in these affections. Combination processes have been omitted (with the exception of Nos. 10 and 11), as they would only tend to cause confusion among the few fields reproduced. The main purpose of this demonstration has been to prove that chronic hyperplastic ethmoiditis and chronic suppurative ethmoiditis are, at least primarily, two separate and distinct pathologic processes.

DIFFERENTIAL DIAGNOSIS

CHRONIC HYPERPLASTIC ETHMOIDITIS	CHRONIC PURULENT ETHMOIDITIS
Secretion clear and watery.	Secretion purulent.
Inferior turbinate hypertrophied.	Inferior turbinate atrophied.
Never crust formation.	Always crust formation.
Headache most prominent symptom.	Headache often light or absent.
Ophthalmic manifestations due to pressure of hypertrophic mucous membrane on vessels.	Ophthalmic manifestations due to infection from purulent secretion.
Gastric disturbances absent.	Gastric disturbances frequent.
Neurasthenic symptoms predominate.	Neurasthenic symptoms not marked if flow of secretion be free.
HYPERPLASTIC TYPE	SUPPURATIVE TYPE
Metaplasia of ciliated epithelium into squamous only where parts have come into contact with other structures.	General metaplasia where secretion comes into contact with mucosa
Meshes of subepithelial connective tissue dilated.	Subepithelial connective tissue shows fibrous formation.
Round cell infiltration scanty.	Round-cell infiltration well marked.
Glands hypertrophied primarily.	Glands primarily atrophied.
Reabsorptive changes in bone predominate.	Apposition of bone predominates.

2032 Chestnut Street.

ABSTRACT OF DISCUSSION

DR. W. E. CASSELBERRY, Chicago: The research and deductions embodied in this excellent paper explain histologically familiar clinical observations, but do not account for certain of the variations in both types of ethmoiditis with which we are impressed in our operations. Non-suppurative or hyperplastic ethmoiditis, which followed exactly the course described by the essayist, I have watched develop and progress in the same patient at periods separated by an interval of ten years. At first there was hypertrophy of both middle and inferior turbinates, the only symptom at that time being nasal stenosis. At the second period, when he applied again for treatment, he was complaining of a sense of pressure far back between the eyes, of a watery nasal discharge, certain neurasthenic symptoms, and it was evident that the bridge of the nose had broadened, which is an important indication of ethmoidal disease. The inferior turbinates were still simply hypertrophied, but the middle turbinates were hypertrophied and polypoid. No real polyps were visible until the middle turbinate was removed, when a flattish polyp was exposed which had been hidden by the turbinate. Doubtless the disease was ethmoiditis from the beginning, but can the deduction be drawn that all cases of hypertrophic rhinitis are to be ascribed in origin to ethmoidal disease? I do not think so, but would value the essayist's full meaning in this respect.

A few years ago, before this Section, I presented a series of illustrations pertaining to atrophic ethmo-rhinitis, so named because I believed that many cases of atrophic rhinitis originated as a suppurative process in the ethmoid bone. Atrophy limited to the inferior turbinal, while the middle turbinal was considerably swollen, had a glistening aspect, and was filmed over by a viscid odorous secretion, represented the first degree. In the second degree, the atrophic process had caused some shrinkage of the enlarged middle turbinal, as shown by lessened breadth and a concave absorption of its under surface, which exposed to view the underlying bulla cell leading to a false bifid aspect. In the third degree, atrophy of the middle turbinals was complete, drainage from the ethmoid cells was thus promoted and Nature's belated

amelioration manifest. It is a suppurative ethmoiditis, but it differs from the ordinary focal suppuration of one or more cells or sinuses. In atrophic ethmo-rhinitis I have often curetted up into these cells, but did not find one or two cells with a focus of "laudable" pus, but found there the same character of secretion as in the middle turbinate region, a thick, glairy, sticky, semi-purulent secretion. Evidently there is more than one type of suppurative ethmoiditis; I should like to hear Dr. Skillern explain the histologic distinction.

DR. GEORGE PAULL MARQUIS, Chicago: I want to emphasize what the essayist has brought out here as to a separate form of ethmoiditis, and I think he has shown, from a pathologic standpoint, what some of us have been observing from a clinical standpoint, that there is a form of ethmoiditis which exists without suppuration. Those who claim that this is simply a manifestation of a chronic suppurative ethmoiditis and that there are periods of quiescence and then an exacerbation with suppuration, lose sight of the fact that in such a case during these periods of remission the symptoms absolutely vanish; the patient is apparently well. in the hyperplastic form we may have an acute mixed infection giving a clinical picture of suppurative ethmoiditis, but as soon as the mixed infection has subsided the symptoms of hyperplastic ethmoiditis continue, with watery discharge from the nose, etc. The headache accompanying this trouble is probably more severe than in any other form of sinus infection. I want to relate a case, that of a clergyman who had had this headache for twenty-two years. He had had any number of examinations and was told that there was no involvement of the sinuses. He had gone to a skillful surgeon and had the supraorbital nerve resected. I diagnosed the condition as a hyperplastic ethmoiditis and on opening the ethmoid I removed probably a teaspoonful of granulation mass from this ethmoid that gave no indication in the nose except one which I am going to call to your attention. Following that there has been no headache and that is a period now of about eight months. This is a typical case in which there was no suppuration in the nose, no polypi, no indication whatever of ethmoidal disease so far as one could observe from our previous methods of diagnosis. What then is the diagnostic sign? I would simply refer you to the remarks of Uffenorde, in which he lays stress on the soft, edematous condition of the mucous membrane on the outer wall of the middle turbinate. Since studying some time with Uffenorde last year, I have been on the lookout for these cases and have been able to find a number. I would lay stress on these signs: severe headache, supraorbital in character, watery discharge, and so-called weakness of the eyes. There may be no sign of pus in the nose, no polypi, and not until we open the ethmoid do we find the seat of the trouble.

DR. O. T. FREER, Chicago: It is only of late that the term ethmoiditis has come into use in the literature, and in a manner which seems based on ill-defined pathologic ideas. Taken literally, it would mean a total inflammation of an ethmoid bone with its coverings. In its present loose employment, however, the designation ethmoiditis is being applied to all chronic inflammations of the ethmoid region, from superficial chronic proliferative catarrhal inflammation, limited to the mucous membrane over the middle turbinated bodies, to an inflammatory degeneration of the ethmoidal turbinated bones and the entire ethmoid labyrinth to the orbit. In fact, everything which in earlier days was defined as nasal mucous polypi is now classed as ethmoiditis, with the wish to convey the idea that these outgrowths are now known to be merely symptomatic of an invariably grave degeneration of the ethmoid bone and its appendages, a condition demanding a radical extirpation of the ethmoidal cells. This view, which I have repeatedly heard expressed, seems to be extreme, and one which has often led to an extensive removal of the ethmoidal turbinated bodies and cells when these structures were quite sound and the true condition merely a polypoid degeneration of the mucous membrane of the middle turbinated body and unciform process. I have often seen a complete cure in such cases after merely a thorough clearing away of the polypi; that is, not merely with the snare, but with the punch forceps.

I think ethmoiditis might be classified as follows: 1. Superficial hyperplastic ethmoiditis. This type is the most frequent. Its main feature is polypoid hyperplasia of the mucous membrane over the middle turbinated body and in the middle meatus, especially in the region of the hiatus semilunaris. While there may be some softening and degeneration of the middle turbinated bone, the bony structures of the ethmoid are not involved to an appreciable extent. The condition may be accompanied by a purulent discharge from the surface of the polypi, but there is no suppuration from the ethmoidal cells.

2. Deep-seated hyperplastic ethmoiditis, non-suppurative. This condition involves the lateral mass of the ethmoid bone to a varying degree, in extreme cases all of the ethmoidal cells being degenerated to the lamina papyracea of the orbit. In operating on such ethmoid bones it is found that the entire middle turbinated body and the walls of the ethmoidal cells have become softened and partly absorbed by rarefying osteitis, so that the punch forceps penetrates with ease into the unresisting body of the ethmoid bone until its arrival on firm bone indicates the proper limit for the extirpation. These are the cases in which the mere removal of polypi is useless and is promptly followed by a new crop, unless the diseased portion of the ethmoid bone furnishing it be cut out, if necessary, to the orbital wall.

3. Deep-seated suppurative ethmoiditis. In this form numerous ethmoidal cells may be found filled with pus. Otherwise, in my experience, the appearance is the same as in the non-suppurative, hyperplastic variety.

I do not find that atrophy is a common accompaniment of ethmoidal suppuration. On the contrary, I often find the hyperplastic type of the disease suppurative, as mentioned. Atrophy of the ethmoid bone and its appendages does occur in the distinct affection called atrophic rhinitis, but atrophic rhinitis causes atrophy of the bony structures of the entire nasal interior as well, and I have not found suppuration of the ethmoidal cells characteristic of atrophic rhinitis. Ethmoiditis usually occurs in adults, while atrophic rhinitis is peculiar to adolescence, and is found especially in young girls. I have found polypoid hyperplasia far more common in suppurative ethmoiditis than atrophy of the ethmoidal structures.

DR. W. L. BALLENGER, Chicago: The point of the paper that impresses me is this: The essayist divided ethmoiditis into two types, the hyperplastic and the suppurative. Now then, it seems to me he doesn't make it very clear why he so divides it. As I understand hyperplastic rhinitis, or the polyp type of ethmoiditis, I should say it is due to an infection just as is the suppurative type; the active etiologic cause is infection. Of course, we have all degrees, from the very mild to the very severe infections; in one little or no purulent secretion, and in the other very pronounced secretion. Now hyperplasia is surely due to a mild form of irritation or infection. The suppurative type is due to a more virulent infection. With a very mild infection the pathologic change is one of hyperplasia. In the more active infection hyperplasia does not take place, but there is a sclerotic condition. In the hyperplastic type we have a low grade of inflammation, and the tissue remains loose and is not compact, as in the more active type of inflammation. In the lower grades, however, we may have and do have some purulent secretion; it may at times be purely mucus. I have found that on first examination I may not find pus, but when I ask the patient if he has a yellow discharge from the nose it seems to me I have almost invariably found that he does, especially in the morning when he first gets up, so that I am rather of the opinion that even the hyperplastic type is attended by a mucopurulent secretion almost constantly, although it may not be observable in the nose on examination.

Now both types of ethmoiditis are due to infection; in one instance a very low grade of inflammation and in the other a more active type. With the lower grade we get hyperplasia and with the other we get a more active inflammation, with more secretion and with fibrous tissue formation.

DR. ROSS HALL SKILLERN, Philadelphia: As to Dr. Ballenger's remarks, I might state that it was his skepticism that

prompted me to present this paper. I thought it might be a good thing to bring the slides out in this way for his inspection. He seems to be at least half convinced, and I hope that time will further convince him.

The latter part of the paper, which I did not have opportunity to read, answers Dr. Casselberry's remarks in a brief way. These pictures are not complete, as it requires a large number of fields to demonstrate thoroughly every condition. The main purpose of the demonstration is to show that chronic hyperplastic ethmoiditis and chronic suppurative ethmoiditis are two separate and distinct pathologic processes.

Dr. Ballenger asks how the conclusion is reached that these two conditions are primarily separate and distinct. He speaks about the infection caused by micro-organisms; that I think is questionable. If one takes it that all diseased conditions are due to pathologic organisms he is right. Recently I have had occasion to examine some of the so-called bone-cysts of the middle turbinate and found hyperplastic ethmoiditis just where the mucous membrane came in contact with the inspired air, the anterior end of the middle turbinate. From this fact it appears to me that this hyperplasia may be due to the irritation of the inspired air without regard to germs which may find lodgment on the mucous surface. The bacteriology of sinus disease is, I think, more or less obscure at the present time, although we have had numerous investigators, particularly among our German brethren. I have done some of this work in the past six months, and have in only one instance been able to obtain a pure culture of one particular organism; there were four or five different micro-organisms, some pathologic and some the ordinary non-pathologic bacteria. I think the time will come when the so-called non-pus-producing organisms will be shown to be capable of causing inflammation. It seems to me it may be possible that the bacillus of influenza may produce the inflammation and then when it has disappeared other non-pathogenic organisms keep up the suppuration. If that theory can stand it will explain a great many things regarding suppurative ethmoiditis. Taking into consideration the fact that there is only a difference in degree between polypoid swelling and polyp formation of the nasal mucous membrane, it is not strange that true polyp formation of the ethmoid may be observed without any empyema of the sinuses existing.

A Social Question.—Tuberculosis is no longer a medical problem; it is a great social question. Given public cooperation, in another generation it will pass away and be but a terrible memory—Martin Cooley, *Jour. Outdoor Life*, October.

TUBERCULOSIS OF THE ANKLE-JOINT AND TARSUS

JAMES WARREN SEVER, M.D.
Junior Assistant Surgeon, Children's Hospital
BOSTON

According to Thatcher in his "Modern Practice," published in 1826, "tuberculosis, scrofula, or 'the king's evil,'" is in its nature peculiarly inveterate, and

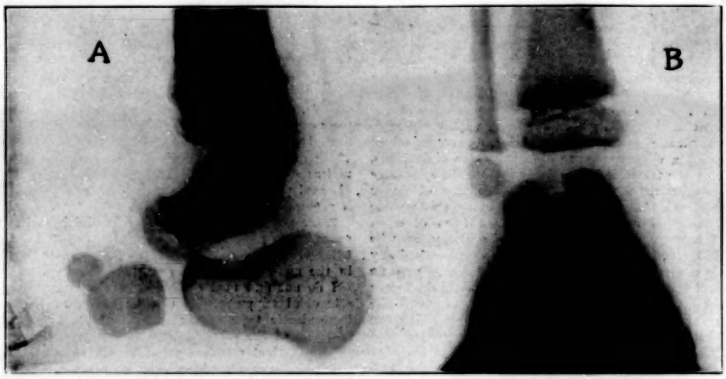

Fig. 1.—Ankle-joint of A. S., aged 1¼ years. A, lateral view of ankle, with destruction of upper portion of astragalus. B, antero-posterior view of same foot. The patient had an abscess opened in front of the external malleolus in November, 1908. In May, 1910, there was slight bony thickening about the ankle, and considerable soft part thickening. All motions were normal at the ankle-joint. Patient toes in slightly; no valgus, no pain.

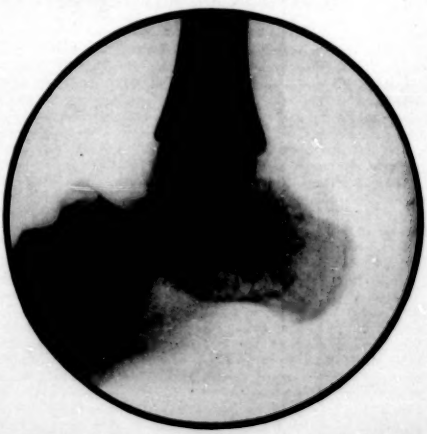

Fig. 2.—Ankle-joint of W. M., from *x*-ray taken March, 1910. Tuberculous astragalus. Excision of astragalus, March 31, 1908. Good motion at ankle. Foot one inch shorter than right. Slight pronation. No marked increase in lateral mobility.

is most generally handed down by parents to their offspring. Children possessing the most lively disposition and a maturity of understanding superior to others of their age, are those most liable to scrofula. It most commonly affects children of a lax habit, with smooth,

fine skin, fair hair and rosy cheeks. It seldom makes its appearance before the second year of age, generally from the third to the seventh, and rarely makes its first attack after puberty."

In many ways this is to-day a correct picture of a case of bone or joint tuberculosis, varying somewhat, of course, in different cases.

Tuberculosis of the ankle-joint and the bones of the foot is much more frequent in children than in adults, and follows next in frequency tuberculous disease of the spine, hip or knee. Affecting bones and joints which have to bear weight, its treatment and course are necessarily much more difficult and protracted than in joints such as the elbow and shoulder. Also, owing to the superficial position of the bones of the foot, abscess formation is more noticeable and subsequent operation usually more often indicated.

Since 1868 there have been recorded at the Children's Hospital 213 cases of tuberculosis of the ankle-joint and bones of the foot. These cases have occurred in a clinic of 7,474 cases of bone and joint tuberculosis, showing a much larger proportion of cases than was shown in the occurrence of tuberculosis of the shoulder or elbow-joint. The cases of tuberculosis of the shoulder and elbow-joint have been reported by me in two recent papers.

Table 1 gives the data in regard to these cases, with the accompanying complications:

TABLE 1.—GENERAL STATISTICS OF 213 CASES OF ANKLE-JOINT TUBERCULOSIS

Total cases	213	Right ankle alone	108
Boys	122	Left ankle alone	90
Girls	91	Both ankles	15

Family history tuberculous	41
History of trauma	27
Average age at entrance	4.8 years

Average duration of disease at time of appearance at hospital, 9.3 months (197 cases).

Complications—	
Ankle and hand (wrist and dactylitis)	15
Ankle and hip	6
Ankle and both knees	1
Ankle and knee	3
Ankle, knee and elbow	1
Ankle and elbow	1
Ankle and shoulder	1
Ankle and spine	9
Ankle and tuberculous peritonitis	1
Ankle with multiple tuberculosis with skin lesions and glands	11
	49

As will be seen, there were a few more boys affected than girls, probably owing to their greater exposure to trauma; a tuberculous family history was important; and about a fourth of the patients had other joints involved. Also it should be noted that a long time elapsed from the onset of the disease—that is, the time the parents first noticed that there was something wrong with the foot—until they brought the child to the hospital for treatment. This delay is often due to lack of responsibility on the part of the parents, and again to mistaken diagnosis on the part of the family physician, who believes the condition to be a chronic sprain or a rheumatic condition. It also points forcibly to the insidious and slow nature of the process. The average age in these cases, it will be noticed, was 4.8 years, as compared with the average age of patients with tuberculous shoulder of 4.7 years, and the average age of patients with tuberculous elbow of 5.3 years, which have been previously reported.

From a study of these cases in regard to their complications, and so far as I have been able to tell from their records, there has been about an equal frequency of the spread of the tuberculous infection from the ankle to the other joints and *vice versa*. The rapidity of the secondary involvement of the other joints has been increased following operation on the original focus, usually a curettage, while on the other hand, without operation, other joints have not become involved until several years have passed, in some instances extending up to five, six and ten years. Trauma to an apparently healthy joint in a child with a preexistent tuberculous joint often leads to the origin of a tuberculous focus in that joint. It would seem that unless an excision were done with as little mutilation as possible of the parts affected there was great danger of an extension of the tuberculous process to other joints, whereas with conservative treatment such extension is unlikely to occur, except after a long time, and especially in cases which present sinuses.

The onset is usually slow in these cases, and may follow an injury, such as a blow or a sprain. Any sprain which does not clear up promptly under the usual measures should make one most suspicious of some other process going on. Swelling follows about the part involved. If the disease is in the astragalus or the lower end of the tibia or fibula, there is swelling about the ankle-joint, often to such an extent that the outlines of the malleoli are obliterated. Where the tarsal or metatarsal bones are involved the swelling is more defined and localized over that area.

Limp and muscle spasm are noticeable, especially in disease of the ankle-joint. Motion is limited, especially in plantar and dorsal flexion. Where the tarsal bones are involved there is usually very little spasm, and the joint motions are practically normal, unless the process is most extensive. There is, of course, the subsequent atrophy of the leg from disuse.

The swelling is usually not a fluctuating one, but is doughy and gelatinous in feeling.

The most frequent location of the disease is in the astragalus, followed in order of occurrence by the os calcis and lower end of the tibia, lower end of the fibula, scaphoid, cuboid and first metatarsal. These joints are working centers of weight-bearing, and subject to constant friction, strain, over-use and general wear and tear, and joints which transmit weight to the ground are usually more subject to strain, injury and disease than others.

The location of the disease in the different bones is shown by Table 2.

TABLE 2.—LOCATION OF DISEASE (BY OPERATION OR X-RAY)

Astragalus	74
Os calcis	45
Scaphoid	14
Cuboid	14
Tibia (lower end)	42
Fibula (lower end)	19
Internal cuneiform	6
Middle cuneiform	6
External cuneiform	5
First metatarsal	12
Second metatarsal	5
Third metatarsal	4
Fourth metatarsal	2
Fifth metatarsal	4
	252
Occurring in more than 1 bone	40

When the astragalus is involved it is usually its upper surface, which leads to involvement of the whole joint, including the lower ends of the tibia and fibula. Areas in the os calcis are more usually localized, do not involve the joint, and are as a rule not as serious an affection, unless the disease is virulent and attacks other bones.

Either the lower end of the tibia or fibula, near or at the epiphyseal line, may be the starting point of the disease, which then usually spreads to the whole ankle-joint. Swelling localized about the internal malleolus usually points to a focus in the tibia, and swelling about the external malleolus to a focus in the epiphysis of the lower end of the fibula. Swelling which obliterates both malleoli usually means that the astragalus is involved, or at least the synovia covering it, as well as the lower ends of the tibia and fibula.

Marked swelling over the neck of the astragalus, and most prominent on the dorsum of the foot, usually points to an active process in that region, which later will probably extend and involve the ankle-joint. (See Fig. 1.)

Foci of disease originating in the other tarsal and metatarsal bones of the foot are not frequent, and may often be limited to the bone in which they originate, or, if the virulence of the infection is great, may rapidly spread to the other bones and so involve the whole foot. In children the tarsal and metatarsal bones are largely cartilaginous, and so have slight resisting power and disintegrate rapidly, especially provided no treatment is undertaken from the start.

Abscesses occur frequently, and this is probably explained by the superficial position and small size of the bones involved, which conditions cause an abscess to form and break before the healing process of reabsorption has a chance to take place, as would happen in bones and joints of larger size in which the focus of disease is more deeply situated.

Following the opening of an abscess, a sinus usually persists. Spontaneous rupture of an abscess is not rare, and many cases of this series presented themselves at the hospital following such a rupture, and with a discharging sinus. In these cases a mixed infection is the usual condition to be combated, and adds to the risk of any curetting operation.

Sinuses persisting after operation are not rare, but their presence depends a good deal on the extent of the operative proceedings and the number and area of bones involved. A clean excision of a single bone with a single sinus, even if long-existent, which removes practically all the disease, should lead one to expect a first-intention wound, without subsequent breaking down, provided the after-treatment is carefully and properly carried out. In this series of cases there were forty patients in whom the disease had attacked more than one bone of the foot.

DIAGNOSIS

The diagnosis of tuberculous disease of the ankle-joint or tarsus is usually easily made. The cardinal symptoms are pain, soreness, limp, swelling, muscle spasm. When the ankle-joint is involved, and when the disease has existed for any length of time, the foot is usually held in slight plantar flexion, with obliteration of the outlines of the malleoli, and occasional inversion of the foot. Increased surface temperature is practically always present and redness when the disease is in one of the smaller superficial bones, or when an abscess has formed.

Chronic sprain, irritable flat-foot, syphilis and infectious arthritis are to be ruled out by the history, *x*-rays and results of treatment. It is usually not difficult for one familiar with these conditions to make a correct diagnosis. Osteomyelitis may be confused with an active tuberculous process, but presents the picture of a much more rapid and virulent infection, which requires immediate operative interference. Disease in the tarsal bones may be localized to one bone, and may be evident on inspection. Also it may have spread and involved the whole tarsus so that the whole dorsum of the foot is swollen, boggy and hot.

Disease of the lower end of the tibia, fibula or astragalus quickly involves the ankle-joint and causes the characteristic swelling about the malleoli, the outlines of which are obliterated.

PATHOLOGY

The pathology of tuberculosis of the bones of the foot is like that of all other bone tuberculosis. Ely states, in defining tuberculosis of the joints, that it is a reaction of the tissues in and about a joint to the presence of the tubercle bacillus or its toxins. He believes strongly in primary infection of the synovia, followed by extension from the synovia to the cartilage and bone. Nichols, on the other hand, believes that all joint tuberculosis is of primary bony origin, starting at the epiphyseal lines in the bone marrow and invading the joint secondarily.

The bacillus usually enters the respiratory tract, or may be in the intestinal tract, when it is usually derived from infected milk. The tonsils are also to be considered as channels of infection. At autopsy the foci are usually found in the lungs, intestines, bronchial and mesenteric lymph-nodes. General tuberculosis may result from a local bone infection, provided the process is active and virulent and the patient's resistance is below par. It may also follow after a curetting operation on the focus, or in a case which has had multiple sinus of long standing.

Following a mild injury there is an inflammatory exudate which offers the tubercle bacilli a favorable field for growth if it is already present in the body; while if the injury is severe the reparative processes are so active that the bacillus is destroyed even if it does obtain access to the injured part.

When the bones of the foot are affected there is the usual formation of the tubercle, which breaks down and becomes caseous, owing probably to the lack of blood-vessels in the destructive process, and also to the action of the soluble toxins produced by the tubercle bacillus.

As I have noted before, these caseous masses, being in bones which are small and superficial, readily appear under the skin, as abscesses. They may remain single or spread and coalesce, and cause extensive destruction of various adjacent bones of the foot.

Repair is brought about by formation of fibrous tissue which replaces or partly encapsulates the tuberculous tissue. This may become ossified, and so may result in bony anchylosis of the part involved.

In detail the histogenesis of the tuberculous process is as follows, as shown by Kertesz through experiments on rabbits:

Tubercle bacilli introduced into the bone-marrow of rabbits are quickly surrounded by polymorphous leukocytes, and they, as well as a portion of the fixed connective tissue cells situated in the district invaded, are destroyed within two or three days. Another portion of the fixed connective tissue cells, as well as the desquamated endothelial cells of the capillaries, increase amitotically. These cells, as well as the young proliferated elements, group themselves about the tubercle bacilli and form the epithelioidal tubercle, which is completely formed as early as the fourth day. The first tuberculous giant cells appear on the fifth day, originating at this stage through a confluence of the augmented endothelium of the capillaries.

On the seventh day lymphocytes group themselves about the tubercle, which latter at this time already shows signs of caseation in its center. On the eighth day the lymphocytes

penetrate the tubercle. The leukocytes do not reach the neighborhood of the bacilli in their initial accumulation from the blood-vessels, but rather from the septa of the neighboring bone-marrow. The lumina of the capillaries in the neighborhood of the tuberculous tissue are obliterated either through pressure, or they disappear through the desquamation of the endothelium, which then begins to proliferate. The accumulation about, and the migration into the tubercle on the seventh or eighth day, takes place also from the neighboring bone-marrow. The connective tissue elements of this tissue proliferate. It is probable that this increase in connective tissue produces the obliteration in the blood-spaces. Redestruction of the tubercle, its coagulation necrosis, is caused therefore, not considering the toxins of the bacilli, by the obliteration of the capillaries and the blood-spaces in its neighborhood.

TREATMENT

The treatment in this series of cases has been operative and non-operative.

Before taking up the results in these two classes of cases I wish to give the outlines of the routine treatment. Given a case of tuberculosis of the ankle or tarsus, the two most essential things to do are to prevent weight-bearing and to enforce absolute rest. These two conditions are the *sine qua non* in the treatment of any tuberculous joint condition, and without them very little is to be expected either for a cure or for a good satisfactory result.

The general condition is most important also, and a healthy, restful, outdoor life, with plenty of nourishing food, is essential.

With disease in the bones and joints considerable variation occurs in the virulence of the infection and the resistance of the individual, and where in one case acute and destructive disease exists, causing great impairment of function, in another the disease may run a very mild course and leave the patient with nearly a normal joint. There is no way of telling at first, however, which type exists, and so the routine is to be carried out in each case. The use of tuberculin in this series of cases of surgical tuberculosis has not been tried. In view of the experience of others, however, it would seem that it is of use in certain cases, and certainly shortens the convalescent period.

Bier's passive congestion method has also proved to be of use, in the hands of others, who state that the course of the disease is shortened, and that a better functional result is obtained.

In order to get relief from weight-bearing and to insure rest of the part, a plaster cast is applied, with the foot at a right angle to the leg, from the toes to the knee. The child is then fitted to a Thomas knee splint, on which he may walk. He is also provided with a high sole and crutches. This is the routine outfit, and is all that has been used in this series of cases, for protection and fixation of the joint.

As in all tuberculous bone disease in children, the great question arises: Is conservative treatment—that is, absolute rest and fixation—better than operative interference—that is, curettage of the focus, or excision of the whole affected bone or bones?

The only way that this question can be answered is by a study of a large number of cases and statistics, with final results. By presenting figures which cover these points I shall endeavor to show that there is a distinct advantage in children, at least, by pursuing a conservative plan, both as to the result as far as function is concerned, and also in time saved.

Table 3 shows the list of operations performed in this series of cases.

TABLE 3.—LIST OF OPERATIONS FOR TUBERCULOUS ANKLE-JOINT

Incision and curettage	46
Astragalectomy	45
Removal of scaphoid	5
Removal of os calcis	15
Removal of cuboid	6
Removal of lower end of fibula	14
Removal of lower end of tibia	11
Internal cuneiform excised	2
Middle cuneiform excised	2
External cuneiform excised	2
First metatarsal excised	2
Second metatarsal excised	0
Third metatarsal excised	1
	156

Taking the ankle-joint first, the records show that it was involved by operation seventy times, including the astragalus and lower ends of the tibia and fibula. This total covers operations for purposes of bone excision, of one or more bones, or parts of bones. This leaves a total of only forty for the other cases of bone excisions, not involving the ankle-joint. The opening and curetting of abscesses in this series amounted to a total of forty-six cases. These operations on abscesses were not done until absolutely necessary, and were done simply for drainage purposes. I have not attempted to classify them, as the resultant data would be of no great significance.

In the operative cases, where nearly twice as many operations were done which involved the ankle-joint, the known results are as follows:

TABLE 4.—RESULTS OF OPERATION

Motion—	
Good	29
Slight	22
None	47
	98
Deformity—	
None	7
Thickening about malleoli	65
Inversion of foot	2
Equinovalgus	10
Shortening of foot	17
Equinovarus	5
Calcaneus	2
	101

These results include forty-five excisions of the astragalus, fourteen operations for the removal of the lower end of the fibula and eleven operations for the removal of the lower end of the tibia.

In the operative cases the average duration of the disease from its onset until treatment was discontinued was 19.8 months (in 114 cases). The average duration of the treatment was 10.1 months. Of the operative cases there were 72 in which there was 1 operation; 17 in which there were 2 operations; 16 in which there were 16 operations; 8 in which there were 4 operations; 1 in which there were 5 operations.

The necessity of operating on a patient more than once depends wholly on the virulence of the disease, the rapidity of its extension, and the extent of the operation done. A number of cases which have only an abscess opened at one time may need later operations for other abscesses, enlarging a sinus, or the later removal of a sequestrum or an entire bone.

In this operative list is also included the few operations which were done on the bones of the foot which did not involve the ankle-joint.

The non-operative results appear in Table 5.

These are the results in those cases which were treated by fixation, rest and protection only until the process had healed. The average duration of the disease in these cases from onset until cessation of the treatment was 16.1 months in 59 cases. The average duration of

the treatment was 6.8 months, giving an average in favor of the non-operative series of 3.3 months from the beginning of the treatment until it was no longer necessary.

TABLE 5.—RESULTS IN NON-OPERATIVE CASES

Motion—	
Good	32
Slight	23
None	33
	88
Deformity—	
None	4
Plantar flexion	1
Thickening	63
Equinovalgus	11
Calcaneovarus	2
Calcaneovalgus	1
Equinovarus	6
	88

From a study of these figures it will be noted that there was a distinct gain in time and also in the function and lack of deformity of the foot in the cases of the non-operative series. It is only natural to expect less deformity in a child's foot in which conservative measures have been followed than after the mutilation of an excision more or less extensive. The time saved is also of importance.

Scudder's conclusions in the series of eighteen cases reported in 1889, which are included in this report, cannot be admitted in view of these later figures. Radical operations on joints and bones in children are not the best methods of treatment, and conservative measures are to be carried out until radical operation is indicated, when all else has failed to stop the progress of the disease.

Operations, then, should be clean. No curetting should be allowed, and any bone or bones involved should be removed *in toto*, with as little mutilation as possible. The increased risk of deformity after an excising operation is, of course, obvious, whereas the non-operative cases which go on to a cure are much less apt to result in deformity, and then not of so serious a nature.

When small foci exist in bones such as the os calcis, the cuboid, the scaphoid and the cuneiform, which are not very active, a conservative course is to be followed. If the process is active and acute, often an incision to establish drainage will prevent extensions, and give the part an opportunity to heal, but removal of the whole bone is not to be practiced unless the destruction is great, the process spreading, or of long duration with a persistent sinus, for the subsequent deformity is of course greater. In some instances subperiosteal excision may be done, which allows the cavity to become filled with new bone in a shorter time than it would otherwise. In other cases the sinus may be probed out, the sequestrum removed, and the bone cavity carefully wiped out with phenol, followed by alcohol, or tincture of iodin may be used. Occasionally a first-intention wound is obtained after this procedure.

TABLE 6.—DEATHS IN CASES OF ANKLE-JOINT TUBERCULOSIS

Years of Age.	Time of Death from First Appearance of Disease.	No. of Operations.	Last Operation Before Death.	Condition of Ankle at Death.	Cause of Death.
3	1 year	2	Few months	Not healed	T. B. meningitis.
4	5 months	2	2 days	Not healed	Shock.[1]
2¼	1 year	2	10 days	Not healed	T. B. meningitis.[2]
3	1½ to 2 years.	1	1 year	Healed	T. B. meningitis.
12	2½ years	1	2 years	Healed	T. B. meningitis.
1½	Few months	1	Few months	Not healed	T. B. meningitis.
4	11 months	0	No operation	Healed, swollen	T. B. meningitis.
2	16 months	0	No operation	Not healed	T. B. meningitis.[3]
3	20 months	1	4 months	Not healed	Gen. T. B.[4]
1	4 years	2	4 years	Healed	Gen. T. B.[5]
9	2 years	3	6 weeks	Not healed	Gen. T. B.[6]

1. First operation astragalus. Part of os calcis, scaphoid and head of ulnar removed. Second operation os calcis curetted.
2. Astragalus and cuboid removed.
3. Eight to ten sinuses about ankle. No operation. Both ankles.
4. Astragalus and scaphoid curetted. Amyloid.
5. Developed lumbar tuberculosis three years later with abscesses, which were opened one and two years before death. Amyloid.
6. T. B. lungs, liver, appendix, mesenteric glands.

DEFORMITIES

Following a cure in either an operative or non-operative case there may be deformity which needs correction. This is to be done by appropriate tenotomies or osteotomies, a sufficiently long time having elapsed to avoid any further lighting up of the original disease. The foot is then to be held in the correct weight bearing position. In looking at Tables 4 and 5 one may see the deformities following the two classes of operative and non-operative cases as far as I have been able to collect reports of them. It is to be noted that the most common result was thickening about the malleoli. This thickening is practically always bony in character, and is due to the deposit of new bone laid down in the healing process.

There is usually also some shortening of the foot from atrophy of disuse, which is generally slight, and also from removal of bone. The shortening is usually most marked when the astragalus has been removed. The other deformities noted are due in part to excisions of various bones and contractions of the soft parts, and rarely follow any rule.

The motion noted is to be interpreted as follows: "Good" means normal to one-half normal; "slight" means 10 degrees to 20 degrees normal. In cases in which certain joints are ankylosed, neighboring joints take up their work and increase their range of motion, so that there is always a certain amount of compensation. For instance, if the ankle-joint is ankylosed, the tarsometatarsal joints will increase their range of motion to such an extent that there is considerable freedom in that joint, which condition of course makes for more ease and freedom in walking and a more flexible foot.

CAUSES OF DEATH

Including Dr. Scudder's six cases reported in 1889, in this series I have been able to find but a total of eleven deaths. Nine of this series were operative cases, the deaths occurring from either tuberculous meningitis, shock or a generalized tuberculosis, at varying intervals after the operation. Some could be attributed directly to the operation as a cause, but others were too remote to lead one to suspect that operation was a factor. These cases are shown in detail in Table 6.

CONCLUSIONS

Tuberculosis of the ankle-joint and bones of the foot in children is insidious in its onset, chronic in its course, and attacks usually young children.

The expectant or conservative method of treatment is preferable to the operative one.

Time is saved and deformity less under the conservative plan than by the operative method.

There is also less danger of secondary joint involvement and general tuberculosis by pursuing the nonoperative plan.

The disease may be associated with bone and joint tuberculosis in other parts of the body.

The prognosis is fairly good for life, but poor for a good ankle-joint in which there is no disability.

A certain number get a good functional ankle, with but slight deformity.

In regard to the smaller metatarsal bones the results are good for joint motion.

234 Marlboro Street.

VARIOUS FORMS OF EXPERIMENTAL DIABETES AND THEIR SIGNIFICANCE FOR DIABETES MELLITUS*

J. J. R. MACLEOD, M.B., Ch.B., D.P.H.
CLEVELAND

In the short time allotted in this symposium to the study of experimental diabetes or glycosuria, I shall not of course attempt to give any general review of all the experimental conditions which may cause reducing substances to appear in the urine. It will be more profitable to devote the greater part of my time to a study of the simplest and best-known form of experimental glycosuria, namely, to that which results from stimulation of certain portions of the nervous system.

I shall, then, briefly consider the relationship to this comparatively simple form of glycosuria of some of the other experimental forms, such as those produced by asphyxia and by the influence of certain ductless glands. Its relationship to clinical diabetes I shall, however, omit, for the reason that there is very little definite information on which to base conclusions.

Before going farther, it may be well to call attention to the distinction that must be drawn between the terms "glycosuria" and "diabetes." The former denotes the presence of glucose or dextrose in the urine and is merely a symptom. The latter is the name applied to a group of symptoms of which glycosuria is one; it is the name of a disease. It is with the chemical pathology of the symptom, glycosuria, that we are to occupy our time.

So far as is known at present, there seem to be three distinctly different mechanisms by which dextrose may appear in the urine. In two of these the appearance of dextrose in the urine, the glycosuria, that is to say, is dependent on an increased percentage of dextrose in the blood. This hyperglycemia, as it is called, may be due either to increased production of dextrose by the liver or to diminished utilization of dextrose in the tissues. In the remaining form of experimental diabetes there is no hyperglycemia, the glycosuria being primarily due to a derangement of the renal function of such a nature as to cause the sugar normally present in the blood to be excreted into the urine.

It is, then, to the first of these three forms of experimental glycosuria that I shall devote most of my attention.

When we sift it down to its essentials we see that a study of this form of experimental diabetes means really a study of those conditions which so disturb the glycogenic function of the liver as to bring about an excessive conversion of its glycogen into dextrose. It may well be asked here of what value to the general question of diabetes such investigations can be. The great attention which has recently been given to the study of such forms of experimental diabetes as that which follows pancreatectomy, parathyroidectomy, epinephrin injection, phloridzin poisoning, etc., has drawn attention away from this simpler type defined above, and this, notwithstanding the well-known fact that at the outset of every form of diabetes there exists an excessive hepatic glycogenolysis. It is not far from the truth to state that in every variety of experimental diabetes there is an excessive production of sugar due to hepatic glycogenolysis; in some of them the glycosuria ceases when all the glycogen has disappeared; in others it persists, the dextrose being now derived from other sources than glycogen and being usually accompanied by a depressed glycolysis. Besides glycosuria other symptoms of diabetes make their appearance. In this latter group of cases the independence of the source of the sugar from the glycogenic function of the liver in the later stages has diverted attention from this function with the result that in seeking for the exact cause of the persistent production of dextrose by the organism, it is often lost sight of that the glycogenic function of the liver has been almost, if not entirely, thrown out of commission, as evidenced by the great poverty of glycogen, even after feeding with excess of dextrose-yielding food.[1] Loss of the power on the part of the tissue to destroy dextrose is usually given as the cause of the hyperglycemia, but the possibility that this is associated with a derangement of hepatic function is commonly overlooked. Hyperglycogenolysis is the first outcome of this derangement; may it not be that the subsequent inability to destroy dextrose in the organism, as well as the production of dextrose from protein, is also dependent on deranged hepatic function?

These preliminary remarks indicate the importance of a more thorough knowledge of the glycogenic function of the liver, and it is to what is already known of this and of the conditions which (apart from lesions elsewhere in the organism) may throw it out of gear that we shall now confine our attention.

SOURCE OF GLYCOGEN

In the short space of time at my disposal, there are of course several aspects of this glycogenic function which must be very cursorily considered and one of these is the source of the glycogen. There is now no doubt that besides the carbohydrates themselves, proteins may lead to glycogen deposition. The most satisfactory evidence on which this conclusion is based has been derived from metabolism studies in diabetic animals, it having been found in these that when proteins or certain of the degradation products of protein are ingested, an increase in the dextrose excretion occurs. The proteins are thus shown to be convertible in the organism into dextrose which, of course, means that, were the glycogenic function of the liver not deranged, they would have been converted into glycogen.[2, 3, 4]

*Read in the joint meeting of the Section on Pharmacology and Therapeutics and the Section on Pathology and Physiology of the American Medical Association, at the Sixty-First Annual Session, at St. Louis, June, 1910.

1. von Norden: Handbuch der Pathologie des Stoffwechsels, Berlin, 1907, ii, 17.
2. Lüthje: Arch. f. d. ges. Physiol., 1904, cvi, 160.
3. Pflüger: Das Glykogen. Bonn, 1906.
4. Lusk: Am. Jour. Physiol., 1908, xxii, 174.

What more particularly concerns us in the present connection is the fate of this glycogen. Following Bernard's teaching,[5] most authorities believe that glycogen is reconverted into dextrose, and delivered as such into the blood whenever that which is already present therein tends to fall below its normal percentage. When the tissues require more carbohydrate in the performance of their metabolic functions, they derive it from the blood which again replenishes its store from the glycogen of the liver; or, if this be all used up, from that also present in the muscles.

No one denies that before being utilized, the glycogen is reconverted into dextrose, but the English physician Pavy[6] has advanced the hypothesis that whenever the glycogen molecule becomes broken down into molecules of glucose, the latter, instead of becoming dissolved in the blood plasma, becomes instantly taken on as a "side-chain by a protein constituent of the blood." He was one of the first to demonstrate the existence of carbohydrate molecules among the degradation products of protein, and, disregarding the fact that it is mainly as glycosamin that these are present,[7] he concludes that they must represent the glucose, which in this form is being transported to the tissues to be utilized as fuel.

Pavy's chief argument against the reconversion of hepatic glycogen into free dextrose seems to be that dextrose could not exist in a free state in the blood on account of its being immediately excreted in the urine. "When circulating through the kidney," so he writes, "it [dextrose] cannot be prevented from escaping like other small molecular bodies and making its appearance in the urine." I have no time at my disposal to discuss this question at any length, and, indeed, it requires little discussion, for it has been unequivocally demonstrated by the recent work of Rona and Michaelis[8] that all the sugar in the blood exists therein in simple solution, some of it in the corpuscular contents, the remainder in the plasma. These workers have shown that when diluted blood is shaken with certain colloids, such as ferric hydroxid or kaolin, the proteins are all adsorbed (*i. e.*, form a colloidal combination) and can be quantitatively precipitated by the subsequent addition of a trace of electrolyte, but that not a trace of sugar is removed from solution by this treatment. Were the dextrose in any way united with the proteins, it would certainly be carried down along with them. Nor is it possible that there can be a disruption of any such compound by the above treatment, for the reagent employed cannot be imagined to have any disruptive action. Another piece of evidence in support of the free state of dextrose in blood is furnished by the observation that, whereas charcoal adsorbs both sugar and protein from a solution containing these two substances alone (*i. e.*, when it is shaken with a solution of protein and sugar), yet it adsorbs the protein but not the dextrose when acetone is present in the solution. The acetone being more adsorbable than the dextrose prevents the latter being taken up by the charcoal.[9] Further evidence of the free state of dextrose in the blood was furnished by dialysis experiments to discuss which, however, would occupy too much of our time.[10]

5. Bernard: Leçons sur le Diabète, 1877, p. 371.
6. Pavy: Carbohydrate Metabolism and Diabetes, London, 1906.
7. Macleod: The Metabolism of the Carbohydrates; in Recent Advances in Physiology and Biochemistry, London, 1906, p. 315.
8. Michaelis and Rona: Untersuchungen über den Blutzucker, Biochem. Ztschr., vii, 329; viii, 356; xiv, 476; xvi, 60; xviii, 375.
9. Michaelis and Rona: Biochem. Ztschr., xiv, 489.
10. Michaelis and Rona: Biochem. Ztschr., xiv, 476

Under normal conditions this production of dextrose by the liver is finely adjusted so that the percentage in the blood is kept about the normal level, which is variously given as from 0.1 to 0.15 per cent. What is it, then, that regulates this amount? It cannot be because of a direct influence on the liver cell of the amount of dextrose in the blood, for, with the exception of that circulating in the hepatic artery, this passes to the liver through the portal system, in which it has added to it the dextrose absorbed by the intestine. Only two other possibilities remain open: direct action on the liver cells of some chemical constituents of the blood other than dextrose, or a nervous reflex.

Experimental evidence at present stands in favor of the latter view. The conversion of glycogen into dextrose or glycogenolysis, as we may call it, which is thus held in control during life, becomes very much exaggerated after death. In a few moments after the circulation of blood through the liver has ceased this glycogenolysis sets in and becomes more and more marked until, after about thirty-five to forty-five minutes, in the case of most livers, it has assumed enormous proportions, after which it gradually declines to disappear almost entirely some considerable time before all of the glycogen has been thus transformed.[11]

During life, an equally active glycogenolysis may be brought about by a variety of causes, but more especially by stimulation of certain portions of the nervous system. This causes an excess of dextrose to accumulate in the blood, hyperglycemia becomes established and as a consequence glycosuria. This is experimental glycosuria or diabetes.

There is nothing to indicate that any essential difference exists between ante-mortem and post-mortem glycogenolysis; in other words, there is a constant tendency for the liver to produce sugar from glycogen. During life this tendency is held in check by some inhibitory mechanism, the break-down or the removal of which is therefore the immediate cause of experimental diabetes. In the further development of the subject, it is from this view-point that I shall proceed, and the first question naturally concerns the cause of the conversion of glycogen into dextrose.

THE CAUSE OF THE GLYCOGENOLYSIS

It has been known for long that the liver tissue contains a diastatic or glycogenolytic ferment. This ferment, which we may call glycogenase,[12] is contained in fairly active form in extracts of blood-free liver, the most satisfactory extract in this regard being that prepared by the well-known Buchner process. It is precipitable in an active state by alcohol, although prolonged contact with this reagent seems to cause a deterioration in its strength. It is extremely difficult to make accurate quantitative estimations of the amount of glycogenase in liver or any other tissue, but, in so far as such estimations have been made, there is no indication that it is any larger in amount sometime after death when post-mortem glycogenolysis is very active, than it is in a liver immediately after death. In the same way, no increase in the amount of glycogenase in the liver seems to occur as a result of those conditions which in the intact animal cause glycosuria.

This statement does not at first sight appear to be in accord with the results recorded by Bang, Lungdahl and

11. Macleod and Pearce: Unpublished experiments.
12. Macleod and Pearce: Am. Jour. Physiol., 1910, v, 255.

Bohm[13] to the effect that in incubated samples of minced (blood-free) liver of the rabbit there is more rapid glycogenolysis in a given time when, prior to death, there exists some experimental condition causing glycosuria. It is evident, however, that Bang's results instead of indicating an actual increase of glycogenase might be explained as due to influences affecting the inhibitory mechanism. Evidently, then, the production of dextrose by the liver, either ante-mortem or post-mortem is due, not to variable amounts of glycogenase, but to variations in the activity of the inhibitory mechanism which holds it in control.

Glycogenase is by no means confined to the liver tissue; it is present, in at least as great amount, in blood and to a variable degree, apart from the blood which they contain, in the kidneys, muscles, intestines, spleen, etc. The fact that as much, if not more, of it is present in blood as in the liver, as well as the other facts regarding its distribution, indicates that there is no relationship between the amounts of glycogen and of glycogenase in the animal body. Here again, is evidence that it is not the presence or absence of the ferment which determines whether glycogenolysis shall occur, but rather some controlling or inhibitory agency.

The same facts regarding the distribution of glycogenase would further suggest the existence of some definite site for its production. Since of all extracts those of the pancreas exhibit by many times the strongest glycogenolytic activity, it has naturally been thought that this gland is the source of the ferment. Should this be the case, there are two paths by which the glycogenase might gain the general circulation—the blood and the lymph. In the former case, we should expect to find glycogenase present in greater concentration in the blood of the pancreatic veins than in blood from the carotid artery. Such, however, is not the case, for both during ordinary anesthesia and when the nervous system is being stimulated in such a way as to produce hyperglycogenolysis, the amounts of glycogenase in the systemic blood and in that of the pancreatic veins are identical. It is therefore impossible to demonstrate any actual secretion of this ferment by the pancreas into the blood probably because of the great volume of blood. It may be, however, that the remarkable strength of the pancreatic extract is on account of the diastase which would otherwise have been contained in the pancreatic juice

The large amount of glycogenase in blood as compared with other tissues explains why the glycogen disappears with greater rapidity from the liver after death when the organ is left intact and full of blood than when, just immediately after death, the blood is washed out of it. The much more rapid glycogenolysis which occurs in a mixture of liver and blood-free liver tissue has naturally suggested the possibility that there might be something in the blood exercising an activating influence on the hepatic ferment. No evidence of such an activation can, however, be obtained, the greater glycogenolysis in the mixture of blood and liver being merely an additive function of the ferments present in each.

Regarding the nature of the mechanism by which glycogenolysis is inhibited or held in abeyance during life, we are almost entirely in the dark. In considering this question it has, however, to be borne in mind that the glycogenolysis produced by glycogenase takes place within the hepatic cell; it is an intracellular reaction and consequently is regulated by the vitality of the cell. In other words, the intracellular glycogenase is prevented from acting on the glycogen during life by forces which are dependent on the vitality of the protoplasm. On the death of the cell, therefore, glycogenolysis sets in. This function of the protoplasm is under control of the nervous system as is illustrated in the various forms of experimental glycosuria about to be described. It is of interest to note that section of all the hepatic nerves does not in itself cause any change in the amount of dextrose in the blood.'[14]

13. Bang, Lungdahl and Bohm: Beitr. z. chem. Phys. u. Path., 1907, ix, 408; 1907, x, 1 and 312.

MECHANISM OF GLYCOGENOLYSIS

We are now in a position to consider a little more fully the various conditions which may bring about glycogenolysis in the liver during life. These, as already mentioned, are the conditions which cause experimental glycosuria. Besides stimulation of certain portions of the nervous system and asphyxia, there are many drugs which have this effect, but since the exact mechanism by which most of these act has not yet been fully worked out, it would profit us but little in the present connection to consider them and we will rather confine our attention to the so-called nervous and asphyxial glycosurias.

The reflex arc through which the nervous control of the glycogenic function is effected has its center located in the fourth ventricle. Mechanical stimulation in this location in rabbits, as by puncturing, is soon followed by the appearance of a large amount of dextrose in the urine, dependent on great increase in the reducing substance in the blood. The glycosuria disappears when all the glycogen in the liver has been used up and it fails to appear when, prior to the puncture, the liver has been rendered glycogen-free by starvation or in some other way.[5, 15] The efferent path from this center to the liver is by way of the cervical portion of the spinal cord and the great splanchnic nerves.[7] The actual existence of these fibers in this portion of the cord has, however, never been demonstrated, for electrical stimulation here so interferes with the respiratory movements as to create a condition of partial asphyxia which in itself leads to hyperglycemia, and when this asphyxia is prevented by delivering a constant stream of pure oxygen into the bronchi, then stimulation of the cord does not cause an increase in the reducing power of the blood.[7, 16] It is possible that the great fall in blood-pressure or the spinal shock may be responsible for this negative result. In the great splanchnic nerves, on the contrary, it is a very easy matter to demonstrate the presence of the fibers;[16] indeed, in my experience, there is no more certain way of bringing about a rise in the reducing power of the blood than by stimulation of these nerves. The nerve fibers involved must of course descend by the cervical portion of the spinal cord, and they leave the cord by the spinal roots in the lower dorsal region.[17]

There must also be afferent influences carried to this glycogenic center and it is believed that these are most plentiful in the vagus nerve, but here again the experimental evidence is faulty on account of the fact that electrical stimulation of these nerves affects the respiratory movements and thereby tends to an asphyxial condition. Indeed, I have so far been unable to cause any increase in the reducing power of the blood by stimulation of the vagus nerves, when, by delivering pure oxy-

14. Macleod: Am. Jour. Physiol., 1907, xix, 388.
15. Macleod and Dolley: Proc. Physiol. Soc.; Jour. Physiol., 1906, xxxii, 42.
16. Macleod: Am. Jour. Physiol., 1908, p. 373.
17. Morat and Dufront: Jour. de physiol. norm. et path., 1894, Series 5, vi, 370; also Macleod (Notes 7, 14, 16 and 19).

gen into the bronchi, I have excluded the possibility of asphyxia.

Splanchnic glycosuria is, I consider, an experimental condition worthy thorough investigation, for in this particular instance, in contrast to practically every other form of experimental glycosuria, we have a simple uncomplicated problem; that is, we are studying the effect on a definite function of a gland produced by stimulation of its nerve. Although, as already explained, the excessive production of dextrose by the liver is not to be considered as the immediate cause of diabetes, yet in every variety of this condition it is the cause of the hyperglycemia in the early stages, and even in the later stages the glycogenic function on which it depends can be shown to be abnormal.

NERVOUS CONTROL OF GLYCOGENIC FUNCTION

In connection with this comparatively simple condition of splanchnic glycogenolysis there are several questions concerning the nervous control of the glycogenic function which are susceptible of tolerably exact investigation. The most important of these concerns the exact nature of the nervous control. Three possibilities exist:

1. The nerve may control the production of the glycogenolytic ferment just as the secretory nerve fibers in the chordi tympani control the secretion of the submaxillary gland.

2. The nerve fibers may have no direct influence on the amount of glycogenolytic ferment, but may exercise a control on those conditions which retard or inhibit its activity.

3. The vasoconstriction produced in the liver by stimulation of the nerve may lead to an asphyxial or anemic condition of the hepatic cells which then permits glycogenolysis to proceed.

In considering these hypotheses it is convenient, first of all, to see whether there is any evidence in favor of the last one. I have attempted to furnish this evidence by making comparison of the rate of glycogenolysis in the liver deprived of its blood-supply (by connecting the portal vein with the vena cava and in some cases also ligating the hepatic artery) with and without stimulation of the splanchnic nerves. In such a case a greater glycogenolysis could not be attributed to changes in blood-supply, and would therefore indicate direct action on the liver cell. Although my first few results in this direction showed a distinctly greater glycogenolysis when the nerve was stimulated, I have been led, by more extended studies on post-mortem glycogenolysis, to conclude that the marked irregularities in the time of onset and in the velocity of this process make it dangerous to depend on such differences as we found for a solution of the problem. It must be remembered that deprivation of its blood-supply in any case brings on a glycogenolysis in the liver which is probably as intense as it can be under *any* circumstances, so that it is scarcely to be expected that an increase in this, due to stimulation of the splanchnic nerve, could make itself felt.[11]

If it be the case that it is merely by its influence over the blood-vessels of the liver that the nervous system controls the glycogenic function, then surely changes in blood-supply produced in other ways should be expected to have a similar effect. The most important experiment in this connection is clamping of the portal vein. If this be done for short periods of time—two minutes or less—there is no evidence that sugar increases in amount in the blood of the general circulation; *i. e.*, no hyperglycemia becomes established, although the first blood issuing from the liver after the clamp is removed must of course have contained an excess of sugar. If the portal circulation be blocked for longer than about two minutes, however, then when it is reestablished, it continues to deliver an excess of dextrose into the systemic circulation so that a general hyperglycemia soon becomes established. Portal stasis for more than about two minutes evidently brings on hyperglycogenolysis which lasts at least long enough to cause hyperglycemia. Nor is it possible with certainty to perfuse the liver outside the body with defibrinated blood containing a normal percentage of sugar, without a rapid glycogenolysis occurring. I have repeatedly attempted this with the observance of every possible precaution against any cessation of the circulation (*i. e.*, starting the artificial circulation through a branch of the portal before the ante-mortem circulation has ceased, etc.), but in only one or two cases have I been able to render glycogenolysis any less active than it would have been in a dead liver. Evidently, then, the glycogenic function of the liver is affected by considerable changes in its portal blood-supply.

Less profound changes in the blood-supply, however, are without effect. Thus clamping of the hepatic artery and vasoconstriction in the splanchnic area produced by stimulation of the splanchnic nerves, after sectioning the hepatic branches so that there could be no direct action on the liver, do not cause hyperglycemia.[7]

I believe that it is highly improbable that the changes in blood-supply produced by stimulation of the splanchnic are of sufficient magnitude to excite glycogenolysis.

By exclusion, therefore, one is driven to conclude that the nervous influence must be either on the production of ferment or on the inhibiting mechanism.

Sufficient work has not as yet been done on this phase of the question to warrant any final decision as to which of these two modes of action is actually involved. But everything so far points to the latter as the more probable. Thus we have been unable to find that saline extracts of blood-free liver after stimulation of the splanchnic nerve are any stronger in glycogenase than those from resting liver. The histologic changes observed by Cavazzani in the liver cells before and after stimulation of the celiac plexus may be interpreted in terms of either hypothesis.[18]

EXPERIMENTAL DIABETES BY ASPHYXIA

A very common form of experimental diabetes is that produced by asphyxia. Clamping of the trachea and injection of curare are the means usually employed to bring about this condition. Many hypotheses have been offered of the mechanism thereby involved: that it is due to diminished oxidation of dextrose in the tissues, that it is due to asphyxial stimulation of the glycogenic center, and that it is due to the direct action of venous blood on the liver. The first of these is certainly untenable, for no hyperglycemia follows asphyxia when the liver is removed from the circulation by establishing the Eck fistula.[19] The hyperglycemia is unquestionably due to increased production of dextrose from the liver. The second hypothesis, *i. e.*, that there is asphyxial stimulation of the nerve-centers, is upheld by the observation that after sectioning all the hepatic branches of the celiac plexus hyperglycemia is no longer produced by clamping of the trachea.[17] Hyperglycemia, however, does

18. Cavazzani, F.: Arch. f. d. ges. Physiol., 1894, lvii, 181.
19. MacLeod: Am. Jour. of Physiol., 1909, xxii, 278.

occur after such isolation of the liver from the nervous system when the asphyxia is produced by injection of curare, indicating, therefore, that profound venosity of the blood may, besides acting on the nerve centers, also act directly on the hepatic cells.[20] This direct action of venous blood in stimulating glycogenolysis might be due either to the increased carbon dioxid content of such blood or to its deficiency in oxygen. By incubation experiments with mixtures of minced liver and blood we have shown that when the glycogenolysis occurring in two hours is compared in atmospheres of oxygen, carbon dioxid and hydrogen the greatest action occurs in an atmosphere of carbon dioxid, there being, however, no difference between that occurring in oxygen and hydrogen. The increased content of carbon dioxid in intensely venous blood may therefore stimulate hepatic glycogenolysis independently of the nervous system, but in ordinary conditions of asphyxia the glycogenolysis is a nervous one.

It is well known that a slight degree of acidity favors the action of all diastatic ferments; the increase in carbonic acid in the blood acts in this regard as any other feeble acid would. This result led me to study the effect on the percentage of reducing substance in the blood of the systemic circulation of injection of small amounts of lactic acid into the blood of the portal vein. I did not, however, obtain any evidence of hyperglycemia, but I do not consider that the experiments are at all conclusive, for it is only with very slight degrees of acidity that diastatic action is accelerated; it is depressed by larger amounts. The amounts of acid injected, though in some cases quite small, were yet probably beyond the optimum.

It has been pointed out that the hyperglycemia following several experimental procedures is in many cases the result of a more or less marked asphyxia coincidentally produced. When oxygen is freely delivered into the alveoli, many of these experimental conditions no longer cause hyperglycemia. We have already referred to this matter in connection with the so-called reflex forms of nervous diabetes, and in that which follows stimulation of the spinal cord. Observations of the same nature have been made by Underhill in the glycosuria-producing effect of certain drugs such as nicotin, morphin, pyridin, anesthetics, etc.[21] It is probable that the free administration of oxygen prevents glycosuria in the cases by its accelerating the oxidation of lactic acid, etc. The free perflation of the pulmonary alveoli also removes carbon dioxid from the blood.

INTERNAL SECRETIONS

As a final group of experimental conditions which produce glycosuria, must be mentioned the secretions of certain ductless glands. Besides the pancreas, whose influence in this connection will be discussed separately in the symposium, we have to consider very briefly the adrenal and the thyroid. Injection of epinephrin, especially when it is made subcutaneously, is followed by glycosuria after a latent period which varies considerably in different animals. When the injections are made intravenously, very little glycosuria is produced. Repeated injection ultimately leads to disappearance of the glycosuria although the hyperglycemia persists. This immunity is probably due to diminished permeability of the kidney to sugar.[22] When the epinephrin injections are given to rabbits that have been starved or treated with strychnin so as to render the liver poor in glycogen, the glycosuria still occurs, and, curiously enough, more glycogen comes to be laid down in the liver.[23] Administration of epinephrin to starved dogs which are fully under the effect of phlorhizin does not cause any increase in the elimination of sugar.[24]

It is sometimes stated that the epinephrin causes glycosuria because it has an inhibitory action on the glycolytic or sugar-destroying influence of the internal secretion of the pancreas; it is supposed to hinder this to such a degree that dextrose accumulates in the blood.[25] There is, however, no experimental evidence in support of this hypothesis. It is more reasonable to explain the epinephrin action as being on the nerve control of the glycogenic function of the liver.[26] It is known that epinephrin owes many of its other physiologic activities to its stimulating effect on the sympathetic autonomic nervous system. It seems rational to conclude, therefore, that hyperglycogenolysis which it induces when given to well-fed animals and the evident derangement of hepatic functions which, as above noted, follows its administration to starved animals, is due to the same cause. In this connection, it is important to note that it is only when the dose of epinephrin is sufficient to cause a rise in blood-pressure that it produces glycosuria.[27]

The parathyroid and probably also the thyroid glands stand in some relationship to carbohydrate metabolism; thus excision of three of the four parathyroids in dogs greatly lowers the tolerance of the animal for sugar and complete thyreoparathyroidectomy, besides causing tetany, etc., causes also glycosuria.[28] Some observers believe that the thyroid glands have an opposite influence to that of the parathyroids in their effect on carbohydrate metabolism.[29] These influences of the thyroid and parathyroid glands have been noted in clinical practice. In hyperthyroidism (exophthalmic goiter) if glycosuria is not present it is readily induced by feeding with sugars; in hypothyroidism (myxedema) glycosuria is practically never observed even when large amounts of sugar are taken.

In explaining these influences of the thyroid and parathyroid on carbohydrate metabolism, it is customary to assume that it can be only on the glycolytic or sugar-destroying action of the pancreas.[30, 29] Indeed, this influence of the pancreas is frequently assumed to be the only function which can be abnormal in diabetes, but there is no justification for this belief, and until there is why should we bemuddle the situation by assuming that the other ductless glands retard or increase its action?

CONCLUSION

I would conclude by again urging that in the utilization of carbohydrates in the animal body the glycogenic function of the liver is at least as important as the glycolytic action in the tissues, and since there is plenty

20. Macleod: Proc. Soc. Exper. Biol. and Med., 1909, vi, 95.
21. Underhill, F. P.: Jour. Biol. Chem., 1905-6, i, 113.
22. Pollak, L.: Arch. f. exper. Path. u. Pharmakol., 1909, lxi, 157.
23. Pollak, L.: Arch. f. exper. Path. u. Pharmakol., 1909, lxi, 166.
24. Ringer, A. I.: The Influence of Adrenalin in Phlorhizin Diabetes, Jour. Exper. Med., 1910, xii, 105.
25. Eppinger, Falta and Rudinger: Arch. f. klin. Med., 1908, lxvi, 1.
26. Underhill, F. P. and Closson: Am. Jour. Physiol., 1907, xvii, 42.
27. Ritzmann: Arch. f. exper. Path. u. Pharmakol., 1909, lxi, 231.
28. Underhill and Hilditch: Am. Jour. Physiol., 1909, xxv, 66.
29. Eppinger, Falta and Rudinger: Ztschr. f. klin. Med., 1909, lxvii, 380.
30. Grey and Sautelle: Jour. Exper. Med., 1909, xi, 659. Ling: Jour. Exper. Med., 1909, xi, 665. McCurdy: Jour. Exper. Med., xi, 798.

of evidence that this glycogenic function is easily deranged so as to cause diabetes, it should be more carefully investigated as to its participation in the cause of those forms of diabetes which at first sight may seem to be quite independent of it.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. LUSK,* MACLEOD, PRATT, WOODYATT AND WALLACE, CONSTITUTING A SYMPOSIUM ON DIABETES

DR. GEORGE C. SMITH, Boston: I think we must consider that a functional glycosuria is distinct from the organic glycosuria that we have been discussing to-day. These organic glycosurias are incurable. In other words, the people who contract that form of diabetes due to pancreatic disease under the age of 20 die, no matter what we do for them, dietetically or with drugs. The form of diabetes that occurs after symptoms of organic disease of the intestines is entirely different; also the form of diabetes that occurs in combination with obesity, which most of us have treated, coming on at the age of 40 to 60 years. These are functional. The more we increase the power of the patients to digest carbohydrates, the more quickly they get well. They come to us with a history of disturbed digestion for a long time, and not only because of sugar in the urine. Reduce the patient's fat by diet, and the sugar immediately disappears. Consequently, we should treat the patients because of their inability to digest carbohydrates. When their weight becomes normal, do not stop there but continue the reduction till you reach the point at which they can digest carbohydrates; then you will no longer find sugar in the urine. I feel, therefore, that the most important thing to-day is to treat the class of glycosurias that we can cure. It is, of course, very important to find the cause of the special form of diabetes before us.

DR. J. A. LICHTY, Pittsburg: I am glad that Dr. Lusk has taken the position which he has with reference to fat metabolism. In some of these cases the fats are our main article of food, which allows us to keep up the proper caloric value of the diet, and if we should find that fats in themselves are converted into sugar, it would make our care of these cases all the more discouraging. I can refer to these papers only clinically, and shall, therefore, discuss Dr. Wallace's paper particularly. I wish to add one or two points with reference to increasing the carbohydrate tolerance. In the early part of my clinical experience with these cases, I directed most of my diabetic patients as ambulatory; that is, I allowed them to go about their business and take their usual physical exercise. Within the last few years I have found by restricting the physical and mental exertion I could increase the carbohydrate tolerance. I have had the patients rest in bed and in the open air very much as we at present treat tuberculous patients. In severe cases in which the diet did not seem to free the urine from sugar, such a course of treatment frequently accomplished the desired result.

Dr. Wallace mentioned in his paper that the less food the patient can get along with and maintain his weight, the better it is for him. I find this experience very valuable in these rest-cure cases. Because of the limited exertion the patients need less food. A few years ago I reviewed my cases of diabetes, a hundred or more, with reference to the relation of gall-bladder trouble and glycosuria. In some 250 of gall-bladder and duct diseases I found only two cases of glycosuria. One would expect to find more, since we know the relation of pancreatic disturbance to glycosuria. I have also in recent years taken up the Cammidge reaction in the urine in these cases, and I have been rather gratified to be able to distinguish a certain class of cases in which the Cammidge reaction is usually found. They are patients of rather mature age. They are rather emaciated and their weight can not be easily increased; the amount of sugar in the urine is small, and they find very little inconvenience from their condition. In the young, thin patients I have never found the Cammidge reaction. I have also had experience with several very interesting cases of diabetes associated with pulmonary tuberculosis. They were usually patients beyond the middle time of life, and belong to the fat, old type. In several I ignored the diabetic condition and fed them as I would a patient with pulmonary tuberculosis. They all promptly lost weight and developed a rather serious condition. As soon as I placed them on a carbohydrate-free diet, even though the caloric value was lower than my former diet, they increased in weight and their condition improved satisfactorily.

DR. J. P. MATTHEWS, Carlinville, Ill.: In my work, I have made a special study of gout and rheumatism. In looking over the literature of these, I found that the idea is that gout and rheumatism are due to a faulty metabolism of the nitrogenous products of our diet. In the oxidation of these nitrogenous products, there is a formation of uric acid and of urea. If urea is not formed by a process of burning up or oxidation, we have these end-products that are a direct cause of gout. Now why could not this reasoning be applied to the subject of diabetes? Why could we not say that there is a suboxidation of the carbohydrates, causing acetonuria, or, as I think the technical term is, the formation of a leukomain or of a poisonous product due to the suboxidation of the carbohydrates? Why cannot a reasoning be applied to diabetes analogous to that which we have applied to gout?

DR. GRAHAM LUSK, New York: I do not wish to have Dr. Woodyatt's excellent paper go without discussion. In my laboratory, Dr. Ringer and I have lately seen that glycocoll, when ingested in phlorhizin glycosuria, is converted into sugar, perhaps through glycollic acid, and afterwards glycolaldehyd. We have also found that glyceric acid can be converted into sugar. Possibly glycolaldehyd and glycericaldehyd as given by Dr. Woodyatt were converted into sugar. If this sugar had been oxidized it might have reduced the quantity of oxybutyric acid in the urine. These experiments might be properly controlled by comparing the action of glycolaldehyd with that of a similar quantity of dextrose itself, to see their relative influence on the diabetic condition. One substance may be named in this connection, that might be of possible benefit, and that is pyroracemic acid. The diabetic may convert lactic acid into dextrose and this is therefore useless. The corresponding ketone pyroracemic acid might possibly be a substance that could be directly burned by the cells in the place of dextrose. If we can by scientific research make such a substitution, we shall arrive at a cure for diabetes.

DR. J. J. R. MACLEOD, Cleveland, O.: I should like to sum up the position with regard to the study of diabetes. I believe that it is wisest to use the most conservative treatment. I think that the conclusions drawn from the recent work done in experimental diabetes have rested on two faulty assumptions. One is that the conversion of glycogen into sugar by the liver is a function variable in amount; and the other is that a large number of the recently discovered instances of this form of diabetes are due to deficient glycolysis. What I should like to bring up is the fact that for neither of these two contentions is there much evidence. The contention that there is a substance in the liver which is susceptible of being secreted in varying amount, there is not a particle of evidence to support. This substance, which we call glycogenase, occurs in rather small amount in the liver. In the case of the dog, there are large quantities of this substance in the blood, and probably relatively not more than 25 per cent. as much in the liver. This being the case, it seems to me that the assumption of the existence of variable amounts is probably faulty and misleading.

DR. R. T. WOODYATT, Chicago: In response to Dr. Lusk's remarks concerning the possibility of getting some antiketogenic substance that will be incapable of being converted into glucose, it seems to me barely possible that such a substance may never be found; for the reason that the conversion of one chemical compound into another is coming more and more to be interpreted as dependent on preliminary chemical dissociation. If lactic acid can go over into sugar, it means that prior to the formation of the sugar the lactic acid must have been in an intermediate, active or dissociated state, susceptible either of transformations, union with other similar molecules or of oxidation. Since the same state is necessary

* See pages 2105 and following.

for oxidation as for condensation, it is possible that to let a substance be dissociated may insure its condensation as well as its oxidation. Therefore, I can conceive that to pursue the search for an antiketogenic substance that will oxidize and not be built up into sugar may be futile. As to the question whether glycerin aldehyd was turned into glucose before oxidizing, I cannot say definitely that it was not, but in the same patient to whom we gave it, larger percentages of sugar were obtained in the urine when glucose itself was given than when glycerin aldehyd was administered. The condition of the patient varied, however, from time to time, in spite of all precautions. The possibility suggested by Dr. Lusk is there, and it would be dogmatic to say that it could not occur. The second chart, in which the glycerin aldehyd was given under conditions that hypothetically favored its condensation into glucose, shows an almost quantitative excretion of the triose as glucose—which is evidence (partly hypothetical, to be sure, but significant) that when glycerin aldehyd did go over into glucose, it then fell out of the body as such.

DEHYDRATION BY DIETETIC MEASURES

AN INTERPRETATION OF THE KARELL, OERTEL AND WIDAL TREATMENT OF CIRCULATORY AND RENAL DISEASES

A. MAGNUS-LEVY, M.D.
BERLIN

The German word, *Schonungstherapie*, being untranslatable, I have adopted as the nearest English equivalent for it the expression "protective therapy" or "sparing therapy." This means to allow an organ to rest and to strengthen it by temporarily making as little claim on its functions as possible. In contrast to *Schonungstherapie* or "protective therapy" is *Uebungstherapie*, a treatment by which an organ is stimulated to work. These are the ideas and terms first employed by the German physician Albin Hoffmann. What they mean will be readily appreciated when the different forms of therapeutics employed in the treatment of the diseases of the heart are considered. Confining an arteriosclerotic patient to his bed is *Schonungstherapie*—protective treatment. If on the other hand walking and climbing are prescribed for him, which of course must be definitely limited, that would be employing the *Uebungstherapie*—treatment by exercise. Hoffmann has most wisely discussed the problems of general therapeutics from these two standpoints: the treatment which protects and spares an organ, and the treatment by which an organ is stimulated to work or perform its functions. Indeed these two ideas are applicable to the therapeutics of the impaired functions of all organs.

The dietetic treatment of circulatory disorders is essentially one form of protective therapy. The names of three authors demand especial attention in this connection; those of Karell, Oertel and Widal. The best and most widely employed methods of treatment are associated with their names, and these also indicate distinct epochs in the development of therapeutics. There are wide differences in the practical standpoints and underlying theoretical considerations adopted by these authors. The essential feature of the Karell treatment is the exclusive use of milk in relatively small quantities at definitely stated intervals. The idea underlying Oertel's method is a great reduction in the quantity of fluid ingested. The Widal treatment on the other hand, consists in excluding sodium chlorid as much as possible from the food, which in other respects is the ordinary mixed diet

Karell was purely an empiricist; he described his procedure as a milk treatment, *la cure de lait*, and stipulated that its rigid enforcement required six weeks. He began in the first week by giving small quantities of milk, from 60 to 200 c.c., four times a day at intervals of four hours. He then increased these quantities in the course of the second and third week, and finally allowed at the end of the fourth week the addition of small quantities of foods intended to stimulate the appetite, such as salt herring and salt bread, but without any other concessions. Only after the lapse of five to six weeks did he allow the patient daily a single real meal, besides which, three times a day, milk in various forms was to be taken. Karell considered that the chief field for his method lay in the treatment of all sorts of circulatory and renal disorders, especially when combined with edema. But he obtained good results in other conditions as well; for example, in the most varied diseases of the gastro-intestinal tract, in neuralgias, and in functional nervous affections. Karell was an excellent practitioner and paid but little attention to theories. He even deprecated any such attitude on his own part and simply said he believed that the results obtained were referable to one of the components of the milk or to the particularly suitable combination of all its components. It did not occur to him that it was chiefly negative qualities that produced the results; that is, the reduction in the total amount of solids and fluids given, and that the treatment was really an especially marked form of protective treatment.

Oertel started out from a theoretical basis. He assumed, with a certain amount of justice, that after the development of a circulatory disorder it was chiefly the increased amount of fluid in the body that made a return to normal conditions difficult. He regarded the daily ingestion of large amounts of fluid as contributing greatly to the work imposed on the heart, and endeavored to correct this factor. The field of his activity explains why he came to devote especial attention to the amount of fluid taken in, for Munich, the city in which he worked, is the city in which the consumption of beer is greatest. He began his investigations and his treatment by allowing his patients to continue their ordinary mode of life, but had them measure the amount of fluid taken in and the quantity of urine voided.

In healthy people the latter usually is several hundred cubic centimeters less than the former, since water is given off also by the skin and lungs. If the amount of water taken in is reduced, in healthy individuals urinary excretion becomes almost correspondingly less; but in subjects suffering from circulatory disorders this decrease is very slight or does not occur at all. That is, by Oertel's plan of treatment an excess of water was removed from the body; circulation was relieved; the amount of circulating blood was reduced; and the restoration of normal conditions was favored.

Oertel assisted this principle of removing superfluous water not only by restricting the amount of fluids taken in but also by other measures, such as exercise, hot baths, etc. He investigated the effect of his treatment on the various forms of circulatory disorders, employing all the methods then available. Determinations of blood-pressure, hemoglobin, of the concentration of the blood, and its amount, appear prominently in his reports. In addition he also devoted much attention to nutrition in general. In obesity, the removal of water was combined with measures for reduction of the amount of body fat, a principle that he carried out in a

more rational manner than did Ebstein. If the patients were emaciated he endeavored to produce an increase in their weight and so on. As far as the quantitative composition of the diet was concerned, he based his mode of procedure on the observations of Pettenkofer and Voit; that is to say, he had already adopted practically our modern point of view. But I might mention that his principle, the prescription of much protein in the food, is at variance with the restriction of fluid taken in, as I will point out later. When the disturbance of circulation was associated with edema he regarded the condition as lying outside of the scope of his specific treatment. This he considered as especially applicable in the moderate circulatory disturbances attending arteriosclerosis, cardiac weakness, and obesity.

Oertel must be regarded as the father of the scientific dietetic treatment of circulatory disorders as founded on theoretical considerations and the rational application. At present, we do not agree with many of his conceptions; but the principles on which his method was founded are still in many respects remarkable.

Science achieved the most admirable triumph when it recognized the significance of the relation of sodium chlorid to the circulation and the development of edema. It is to Widal that this conception is chiefly due. He started from theoretical considerations, and also from experiments at the bedside. After it had been established by various observations that sodium chlorid was poorly excreted by the diseased kidney, he and Strauss simultaneously hit on the idea that it was precisely the retention of this substance which was the crucial factor in the production of edema and that gave rise to its appearance. We are all familiar with the brilliant experiments by which Widal furnished irrefutable proof of this conception.

I know of few observations in the whole history of metabolic treatment that can be compared to this for simplicity, clearness, and ease of demonstration. It is a classic experiment. With this single experiment, the result of which has frequently been corroborated, the predominant part which sodium chlorid plays in the retention of water was definitely proved.

The important part played by this substance in the water content of the diseased body can also be demonstrated for the healthy individual. Permit me to make a few observations in this connection. The various organs possess a definite content of sodium chlorid which is much less than that of the blood. The muscles are poorest in sodium chlorid, containing only 0.1 per cent., while the connective tissue, with 0.3 to 0.4 per cent., is richest. According to my analyses the total amount of salt in the body of a healthy man may be estimated as 130 gm. Owing to the fact that we take in a considerable amount of table salt, about 15 to 20 gm. a day, the body always contains an excess of medium chlorid above the minimum. When a healthy person fasts absolutely or takes his ordinary diet without the addition of any salt, he gives up 10 to 20 gm. of sodium chlorid. At the same time, he loses 1 to 2 kilograms in weight, without, however, sacrificing protein and fat. He gives up 1.5 liters of fluid, i. e., lymph. If now 15 to 20 gm. a day of salt are added to the salt-free diet, the healthy body does not during the first days excrete this amount completely, but retains the 15 to 20 gm. originally lost and at the same time corresponding quantities of water, 1 to 2 kilograms, are again stored up; in other words, the excess of sodium chlorid which is retained by the body on a normal diet and under normal conditions does not contribute to an increased concentration of the juices in this substance, but demands its own amount of water for solution, and in this way augments the quantity of fluid circulating in the body.

This fact having been established, Oertel's conception of restriction in the ingestion of fluid must be subordinated to the task of reducing the sodium chlorid. Whenever this is cut down, thirst becomes less and the amount of water taken is decreased in the natural course of events, without imposing on the patients the restriction of fluids.

In general it may be said that the salt-free treatment has only seldom been carried out in its most radical form, as it had been applied by Widal in his famous experiment. This is due to several facts; in the first place to the lack of persistence of physicians and patient. While the principle of the salt-free diet appears simple enough to apply, practically it requires thorough knowledge on the part of the physician and much energy on the part of the patient. The physician will always be more inclined to reduce the edema by stimulating renal activity with drugs rather than by the principle of protective therapy.

In a large number of cases the desired effect may be obtained with theocin, diuretin, digitalis, and so on. When this is not the case, the physician sometimes prescribes a salt-free diet, but promptly abandons this if it is not quickly effective. I should like to give an example of the amount of persistence and care required, and of what excellent results may then be obtained even in desperate cases. Last winter I found in the Friedrichshain Hospital two patients with severe parenchymatous nephritis and enormous edema. Both of these had been treated for five or six months with all sorts of remedies. Digitalis and digalen, theocin, diuretin, theobromin, potassium acetate, calomel, purgatives, hot packs, and scarification, had all been systematically resorted to in the course of half a year without leading to any permanent improvement. I now gave both patients a full mixed diet with meat, eggs, potatoes, vegetables, milk, bread, zwiebach, and fruit, without excluding any article of diet, but without the addition of the least traces of salt. The bread, zwiebach, and butter also were made without the addition of any salt. In the case of one patient, a boy of 14, the weight in the course of three weeks fell from 55 to 40 kilograms, but that of the other changed but little. My colleague, Stadelmann, who knew the patients of old, expressed the opinion that but little result was to be expected. In the next four weeks, however, the patient lost 30 kilograms in weight, and the last trace of his edema disappeared. During these four weeks he had excreted about 300 gm. of sodium chlorid. In the first three weeks the kidney had been only slightly permeable for the salt, and therefore but little water could be removed from the body. After the excretory power of the kidney had been spared (*geschont*) during the first weeks a period of greater activity followed which quickly brought about the complete removal of the edema. In such difficult and desperate cases not only persistency and stern determination are necessary, but also the strongest restriction of sodium chlorid. The patient received about 2 to 3 gm. of sodium chlorid a day in his food. If he had been treated a little more laxly and had been allowed even 5 to 6 gm. only, he would never have been freed from his edema.

The importance of this observation lies in two facts, namely, (1) that the salt-free diet had proved efficacious

after all other therapeutic measures had failed; and (2) that it required fully seven weeks, in the first of which no distinct improvement seemed to be obtained.

The salt-free diet is most efficacious in parenchymatous nephritis. In this condition, in which the salt does not pass through the diseased kidney, its significance is perfectly evident, and the immediate therapeutic effect is most striking. But also in other forms of passive congestion, as in cardiac insufficiency and cirrhosis of the liver, the removal of salt from the food is often followed by surprising results. The mechanism is a little different from that in renal disease. In these conditions also a portion of the excess of sodium chlorid is retained in the body, not, it is true, because the excretory power of the kidney is primarily impaired, but because of the circulatory disorder. The salt is retained in the body together with corresponding quantities of water and other components, firstly in the blood-vessels, then either as edema under the skin, or as free fluid in the abdominal cavity. On cutting down the superfluous amount of salt taken in, the increase in the edema and the transudation ceases; this is followed by a certain equilibrium and the mechanics of the circulation become more favorable. Now the kidneys begin to secrete more actively, and this is followed by removal of the edema. In many forms of broken compensation, it is possible to bring about normal conditions solely by removing an excess of sodium chlorid from the food, and without the assistance of any drugs. Even pleural exudates, whose development is less dependent on the quantity of sodium chlorid than that of congestive transudates, are sometimes favorably influenced by a salt-free diet.

Let us now ask, what is the relation between the different so-called treatments of Karell, Oertel, and Widal, and how have we to judge them from a theoretical and from a practical standpoint? The Widal treatment has this in common with the strict milk cure of Karell, namely, the small amount of salt that is allowed the patient. Indeed, it was Widal who explained the well-known efficacy of the milk diet in nephritis by pointing out the small amount of salt present in this fluid. The salutary properties of milk depend, not on any positive characteristics, such as a peculiarity in the nature of the protein molecule, or a specific diuretic action of the milk-sugar, the fine subdivision of the fat in an emulsion, or on any particularly favorable mixture of these substances, but rather on a negative quality, its poverty in sodium chlorid. But even milk may be too rich in salt when given in large amount, and Widal has particularly emphasized this fact. Three liters of milk, which is the minimum amount necessary to maintain equilibrium, contain 5 gm. of sodium chlorid, and this is more than many a diseased kidney can excrete. A mixed diet of meat, eggs, bread, etc., like that referred to above, contains only 1.5 to 2 gm. of salt, if none has been added.

Whereas Karell's diet is similar to that of Widal in the low quantity of salt, it differs from that of Widal in the great reduction in the amount of all foodstuffs. During the first week the patient does not receive even a fifth of his requirements, and during the first five to six weeks the physiologic minimum is never reached. During this time the patient accordingly loses considerably in body protein and fat. The principle of Karell's treatment, therefore, consists in a reduction of the amount of all the foodstuffs allowed. In many cases it is more suitable than the Widal treatment, when this is carried out in the manner in which Widal performed his celebrated experiments. But it must not be overlooked that Widal in the above instance made use of a full dietary with 120 gm. of albumin, 170 gm. of carbohydrates, and 100 gm. of fat, in order to exclude all other factors, and to demonstrate the predominating rôle of sodium chlorid in water metabolism. In everyday practice not only is it unnecessary to carry out the treatment in this way, but it may even be injurious for the following reasons:

The ingestion of all organic foodstuffs increases the amount of fluid in the body in a manner similar to sodium chlorid, though not to quite so marked a degree and by a somewhat different mechanism. Fat appears to do this least, although for the purposes of its absorption a certain amount of bile, pancreatic juice, and intestinal juice is poured out; but as it does not dissolve in the body juices and is only emulsified by these, its further transportation through the lymph and blood vessels does not require the assistance of water. The absorption of the carbohydrates demands considerable amounts of water, since the glucose content of the blood-serum rises only from 0.1 to 0.3 per cent. at the most. But as soon as the glucose molecule has been deposited as glycogen or has been oxidized, it makes no further demands on the water supply of the body. The water metabolism is most strongly influenced by the protein molecule. Not only does it require for its absorption and its transportation in the body relatively large amounts of water, but its end-products, urea, uric acid, etc., also demand considerable amounts of fluid for their excretion. It is for these reasons that the ingestion of much protein makes greater claims on the water-supply and on the organs of circulation, than do other foodstuffs.

The relationship of the protein metabolism and of sodium chlorid to the water metabolism is particularly well shown in diabetes insipidus. In the true forms of this affection it is impossible to control the increased excretion of urine by applying only Oertel's principle of restricting the ingestion of fluid, but thirst and the amount of urine excreted immediately become less when the amount of salt taken in is reduced from 20 to 5 gm. The same thing happens if the quantity of albumin is cut down from 120 gm. to 60. Instead of 40 gm. of urea produced under the former conditions, now only 20 are excreted and the quantity of urine may be diminished by several liters more. In a similar way the reduction of the amount of protein in the food is of benefit in all circulatory disorders, though the effect is not quite so noticeable as in diabetes insipidus. In each instance the work of the vascular system and of the kidney is lightened.

RECAPITULATION

To recapitulate, we are in possession of three methods of reducing the amount of body fluids, and, in this way, effecting the dehydration of the body; in the first place, by lessening the amount of water ingested (Oertel's treatment); in the second place, by the reduction of the sodium chlorid taken in (the cure of Widal); and in the third place, the use of a restricted dietary, especially poor in protein (Karell's cure).

Besides Oertel, the somewhat unreliable Schweninger and the layman Schroth, Von Noorden has laid emphasis on the reduction of the fluid intake. Von Noorden found this measure particularly efficacious in the polyuria of contracted kidney and in advanced arteriosclerosis. The reduction of the fluid taken in from 3 or 4

liters to 1.5 to 2 liters, was followed by a great improvement in the condition of the patients. In many instances the blood pressure fell 30 to 40 mm., the nocturnal polyuria became less, and the nocturnal attacks of angina and asthma ceased, especially when no fluids were taken in the course of the evening. Von Noorden has demonstrated that 1.5 liters of urinary water suffice in cases of contracted kidney for the removal of all the products of metabolism, and that there is no danger of uremia under these conditions. In such cases in which a great excess of water had previously been taken the effect of reducing its intake is very pronounced, and is readily explicable on theoretical grounds.

It is but rarely, however, that the effect of reducing the amount of water intake depends on this factor alone. As soon as this measure is enforced with some degree of strictness, so that the patient receives less than 1 liter of fluid per day, in most cases he will find it impossible to eat as much as before. This explains the well-recognized value of reducing the consumption of fluids in the various obesity treatments, as in that of Oertel, in that of Schweninger, etc. Schweninger allowed his patients to drink freely between meals, but forbade drinking at meals. The importance of this prescription evidently lies in the fact that, by forbidding drinking at meals the amount of food taken is reduced. The same principle is to be found in the thirst cure of the layman Schroth, in which a further loss of appetite is caused by the monotony of the diet. But I wish to emphasize especially that, contrary to the views of the laity and to the erroneous theoretical considerations of Oertel, Schweninger, etc., lessening the amount of water does not increase the oxidation of fat. This happens only in the most extreme forms of thirst cure, after the method of Schroth, when fever, abnormal decomposition of proteins and other dangerous complications occur. On the contrary, it is possible with proper management to carry out obesity cures not only without cutting down the water ingestion, but even by giving large amounts of fluid, as has been suggested recently by G. Rosenfeld. This clinician favors filling the stomach and intestine as much as possible with water, in order to control the subjective sensation of hunger. It is possible that these large amounts of water may stimulate metabolism and the oxidation of fat. That this is true has apparently been demonstrated by Heyl.

I believe that the effect of reducing the amount of fluid alone is seldom dependent on this factor only, as for example in chronic interstitial nephritis. In general the measure acts indirectly by inducing the patient to become unconsciously more abstemious in eating and usually to avoid strongly salted food which increases thirst.

The reduction of sodium chlorid is indicated especially in the edema of parenchymatous nephritis, but it is also useful in combating some of the symptoms of contracted kidney, such as headache, uremic asthma, angina pectoris, and pulmonary edema. Diabetes insipidus and cirrhosis of the liver also require mention in this connection. It seems to me that it is wrong to allow patients who have been relieved of dropsy and other chief symptoms by a Widal treatment to return to their ordinary salty diet. Although the excretory capacity of the diseased kidney undergoes considerable improvement after a period of functional rest, so that it may at times be rendered capable of excreting 5 to 10 gm. of sodium chlorid instead of only 1 to 2 gm., it would be wrong to impose on it a normal amount of work. In cirrhosis of the liver I also attach much importance to a long-continued reduction in the salt intake. While the reaccumulation of ascites after aspiration does not depend exclusively on an excess of ingested sodium chlorid, this is none the less an important factor. I would call attention to Achard's instructive case of cirrhosis of the liver in which he succeeded in removing the ascites five different times by enforcing a salt-free diet. Patients with diabetes insipidus must permanently refrain from a salty diet, since it is impossible to improve the capacity of the diseased kidney for excreting concentrated urine.

I now come to the third point, the reduction of the protein intake. I have already indicated that Oertel's two principles of low water and high protein intake—he required up to 200 gm. of protein a day—are at variance with each other. His regulations date back to a time when the study of metabolism was chiefly concerned with the behavior of the proteins, and the maintenance of the nitrogen equilibrium was held to be the most important consideration from a therapeutic standpoint. At that time it was believed that the bodily weakness which sometimes appeared in rapid obesity cures was due to a loss of muscle protein particularly by affecting the heart. But I should like to call attention to the fact that a loss of albumin content and of muscle volume by no means invariably leads to impairment of the capacity for bodily work. (This is plainly evident when persons unused to bodily exercise take up some mild form of sport, especially moderate mountain climbing. In spite of the fact that there is at first a prompt loss, both of fat and of muscle tissue, the cardiac and body musculature improve greatly in functional capacity). Felix Hirschfeld was the first to oppose the theory that a patient with heart disease should be protected against further weakness by abundant food, particularly by the administration of large amounts of protein. His firm stand in this respect was well grounded. He showed that reducing the amount of water alone did not suffice to restore compensation, but that it was necessary at the same time greatly to cut down the food taken as a whole. His opposition to Oertel's teaching is entirely correct on this point, and this has been demonstrated by many clinical observations.

In addition to its immediate effect on water circulation, a diet poor in proteins probably acts favorably in other directions also. Chittenden has called attention to its advantages in healthy persons, without, however, being able to explain this result in detail. In some diseases we can plainly demonstrate the harmfulness of a diet rich in protein, as, for example, in diabetes mellitus. In this condition it impairs the tolerance for carbohydrates, sometimes to a most pronounced degree. In opposition to Oertel's opinion, reduction in the ingestion of protein is particularly to be recommended not only in cases of broken compensation, but also in the case of cardiac patients who were previously high livers and exhibit a certain degree of plethora. It is also particularly indicated in the later stages of chronic interstitial nephritis, when uremic manifestations of greater or less severity appear. These are due largely to the retention of nitrogenous end-products of metabolism. I do not wish by any means to go to extremes and recommend always a minimum of protein in such cases, but I do consider it more advantageous for a nephritic in his last years to sacrifice a few kilograms of weight on a scanty protein diet and feel fairly well, rather than to maintain his weight at the expense of chronic uremic manifestations.

What shall be our attitude in regard to these forms of treatment in an individual case? I think that it is best if we first attempt to carry out each one of the three treatments exactly according to the directions of Karell, Oertel and Widal, in suitable cases. Only in this way can we form a correct opinion of their principles and their utility. Each one of these principles of water removal is attended by certain difficulties in its practical application, and these can best be overcome at first by strict adherence to the rules laid down by the three authors. When we have done this a few times we shall be able to deviate from the regulations and modify them in detail. Then we shall be able to determine whether it is more advantageous in a given case to secure relief for the circulation by restricting the intake of water, by a salt-free diet, or by reducing the amount of albuminous food, which as a matter of fact reduces itself to forbidding or restricting the consumption of meat but sometimes also of milk. In the Karell treatment I consider it particularly important to adhere carefully to the four-hour intervals between the separate portions of milk allowed the patient. It is frequently necessary to use skim milk, as Karell advises, in order to accustom the stomach of the patient to the monotony of the milk diet.

The salt-free diet of Widal is theoretically easy to administer, but one is apt to encounter the opposition or lack of comprehension of the cook. It is hardly necessary to forbid any article of food if only it is given in its natural condition and without any addition of salt on the part of the human hand. Of the fresh articles of food only salt-water fish are to be excluded. The butter should be unsalted and the bread must be specially baked without salt. Of course all forms of preserved meat and fish as well as cheese must be avoided, for these contain a great deal of salt. Milk also can be permitted only in small amounts, for it contains about 2 gm. of sodium chlorid per liter. By giving chiefly cereals, oatmeal, rice, hominy, custards, jellies, puddings, fruit, and desserts, the lack of salt is made more endurable to the patient.

If we wish to allow a patient a certain amount of salt after he has been for some time on a salt-free diet, we should not content ourselves with the general direction that he shall use moderation in salting his food, but prescribe a definite amount that is allowed. The conditions are comparable to those in diabetes mellitus, in which instance it is necessary to give the patient the most precise directions. I, myself, manage in this way. I have the food prepared without salt just as during the strictest period; then I give the patient small, accurately weighed quantities of salt, say 2, 4, or even 6 gm., and permit him to add this salt to his food in whatever way he wishes during the twenty-four hours.

The dietetic measures are just as important in the treatment of circulatory disorders and renal diseases as is the dietetic treatment of the glycosurias. I should feel much gratified if what I have said should enable any to gain a deeper comprehension of the principles involved and to apply them more widely than before.

Berlin, N. W., Karl-Strasse 5b.

Absence of Puncta Lachrymalia (Bilateral).—A child, aged 10, suffered from epiphora since birth. An attempt was made to pick up the opening in the canaliculus in the left lower lid, without success. The right gland was partially removed through an incision at the outer margin of the upper lid. Not succeeding, both lachrymal glands were removed through the conjunctiva at outer angle of the upper lid.—L. Cole-Baker, *Proc. Roy. Soc. Med.*, July, 1910.

HOUSE QUARANTINE *

H. COHEN, M.D.
Assistant Chief of Bureau of Contagious Diseases, Department of Health
CHICAGO

It is hard to separate the causation of disease in man from the influence which organized society exercises on him. The relations are many and complex, acting in divers ways, and not always with visible directness. For one thing, if you think of it, the important factor of heredity in the causation of disease is, truly and broadly considered, a social factor. And when we mention environment, the other half of the entire etiologic circle, it is readily seen that that in particular depends on the social aggregate and its intelligence and activities in behalf of the preservation of health for its composition and complexion, for the power of doing good or evil, for its influence on health and disease.

Man probably suffered from certain diseases and accidents in his pre-social days, but that the greatest percentage of man's present ills is socially caused, directly or remotely, is a certainty. Whereas the above applies, more or less, to all diseases, it is particularly applicable to the contagious diseases. Seed, soil and the planting of the seed are the three requirements in the causation of contagious disease; man himself fulfills two of these; he offers the soil and acts as disseminator of the seed through the avenues of social intercourse.

It follows that the control of contagious disease is a proper and necessary function of organized society. The individual is now considered an asset of the state, which would suffer loss by his illness or death, even if the effects were limited to himself. How much greater the mischief and loss is to the community in the case of contagious disease, anyone can readily see. And the community owes each of its citizens protection against contagious disease as well as against fire, against robbery and murder.

THE QUARANTINE PROBLEM

When the prevention of disease first claimed public attention, when it first began to be the concern of organized government, it was readily seen that the gathering of health statistics was of prime importance. And so it is, if properly utilized. Health statistics should furnish a guide as to proper health measures and methods; it should indicate to us the preventable leaks to life and health; it should be an aid, and not an aim. By itself it will accomplish nothing. We must not stop with that. Advanced and aggressive attitude and action is urgently needed in the control of contagious diseases.

In house quarantine, we have an important measure in the safeguarding of the well from the existing foci of infection. It is a truism to say that the essential features of the contagious diseases are their communicability, yet the fact needs emphasizing. There was a time when, owing to the lack of knowledge as to the cause, and by reason of the prevalence of superstition, epidemics of contagious diseases were attributed to visitations from heaven. Those times are, happily, passed. We now have a more exact knowledge of the cause of contagious diseases. We are now better able to cope with them because we more fully understand the actual determining cause, the various pathogenic bacteria, the contributing factors, and the means and modes of how these germs are carried from the sick to the well.

* Read in the Section on Preventive Medicine and Public Health of the American Medical Association, at the Sixty-first Annual Session, held at St. Louis, June, 1910.

But we must make intelligent application of this knowledge if we are to minimize these diseases. We believe that persistent application of the principles of preventive medicine will ultimately lead to the almost total eradication of contagious disease.

A survey of the premises of the quarantine problem brings to the fore the following as the most salient:

1. The patient the only original source of infection.
2. The patient and contacts the most dangerous carriers spreading infection.
3. Houses and objects such as bedding, clothing, toys, etc., harbor and give off infection.

How best to meet and circumvent the difficulties presented by these three factors is the crux of the quarantine question.

Before outlining the measures and methods here advocated and now in force in Chicago, let us dwell for a moment on conditions as they are with respect to the management of contagious disease and the many relations which it has to the public health. The statements here made are chiefly based on experiences in this work gained in Chicago. I am sure that they apply to a greater or lesser extent, to all larger towns and cities.

In our daily work we come in contact with people of all races and nations, people of all degrees of material welfare and educational status. We find the greatest disregard for the proper management of contagious disease, the greatest hindrances, due to the following causes:

1. The thraldom of inhumanizing poverty in which great numbers of the foreign-born population find themselves, with the woeful overcrowding attendant on it.
2. Ignorance and superstition—dense, miry and demoralizing—productive of a stupid disregard for all health regulations.
3. A peculiar nonchalance on the part of the semi-intelligent who think that they know it all and need not be taught how to properly care for a contagious case or themselves be subject to necessary restrictive measures.
4. The outright and outrageous assertion of self-interest against community interest on the part of some of the wealthy families and individuals in the community.

The following concrete instances elicited in a recent series of investigations to determine the exact mode of spread of contagious disease, will illustrate conditions as they are:

Series 1.—Diphtheria, six cases, two deaths. A child took sick with "sore throat." No physician was called in. The child grew worse and died. In the next house lived a relative of the above family whose daughter took sick several days later and also died. Four more cases rapidly developed in the surrounding families. Investigation showed that all had been visiting each other, had traded in the same neighborhood stores and otherwise neglected the most ordinary precautions.

Series 2.—Scarlet fever, four cases. First patient took sick on the eleventh of the month. The family in which the case occurred owned a small store, and through fear that the business might be interfered with, called no doctor. The case was not discovered until the fourth of the following month—nearly a month after it developed. Meanwhile the patient was out playing with other children, three of whom took the disease from her.

Series 3.—Scarlet fever, six cases. A boarder in a poor family returned from the hospital where he said he had a "sore throat" and a "breaking out." Eight days after his return a 19-year-old son of the family, who shared the same bed with the boarder, developed scarlet fever and two days later, two other children of the same family came down with scarlet fever. The three patients were removed to the hospital and the boarder was asked to seek another place. The house was immediately disinfected. Within a week two more children came down with the disease.

Series 4.—A youngster who was delivering newspapers into a scarlet-fever-infected house, himself came down with scarlet fever. His playmate and companion who went around with him while delivering the newspapers, also took the disease.

Series 5.—A little girl convalescing from scarlet fever met her chum; the usual kissing and embracing ensued. Several days later the other little girl was stricken with scarlet fever.

The instances are innumerable, repeat themselves everywhere, and are well known to you. They go to show that the people are ignorant of the primary laws of contagious disease and of the danger that lurks in them. It proves that we have neither sense enough to protect ourselves, nor conscience enough to protect our neighbors. It indicates a degree of public lethargy toward the existence of preventable disease and death that harks back to the dark ages.

In another series of investigations to determine the source of infection of cases of diphtheria and scarlet fever reported during the period of a week, the following was learned from those whose direct connection with a previously existing case was definitely established.

1. Twenty cases were traced to the association with a patient in the immediate vicinity.
2. Ten cases were due to association at school with children in whom the disease was unrecognized.
3. Four cases were caused by contact at the playgrounds with children in whom the disease was mild or undeclared, or with convalescing patients.
4. Three cases were found to be the result of an unreported case.
5. Two cases owed their existence to previous cases in the family.
6. Many cases were attributed by the family to a "cold"—only a predisposing factor, if true. More likely, the first signs of the illness, particularly in diphtheria, were taken for a cold.

The lesson is the same no matter what superficial cause may be assigned. It is always association with a previous case, in one way or another.

In the poorer sections of the city, it used to be the usual thing to find mothers with diphtheria-sick children in their arms gossiping with neighboring women likewise with babies in their arms and with several older children clinging to their skirts. Tales of woe are exchanged, sympathies are extended, and disease is given in return. Children suffering from scarlet fever in the convalescent stage were almost always found outside when the weather permitted, with hands desquamating, neck perhaps swollen with suppurating glands, surrounded by a crowd of boys all gamboling on a vacant lot, all absorbing the insidious elements of contagion. Visiting and receiving callers during the quarantine period is quite the thing with certain classes of people. Allowing the inmates in contact with the patient, as well as the patient himself, to run loose on the streets and mingle with the well, is an almost universal practice.

When the people shall appreciate the enormity of the crime of throwing a burning fagot of contagion into a mass of disease-inflammable children, such practices as above will be no more. Then the burden of sickness, the host of innocently crippled children and the toll of death will be much less—very much less. That the danger of conditions as they exist has been theoretically recognized is attested by the laws and ordinances everywhere in existence, if not in force. In almost all cities there are adequate laws and ordinances which, if rigidly applied, would meet the problem. The fault lies with the lack of enforcement of the rules. The attempts at

enforcement are spasmodic: It usually takes an epidemic to stir the people into apprehension and the authorities into action. Here, too, in the very field of preventive medicine, that famous "ounce of prevention," has not yet been pounded into consciousness and practice. As a rule, the entire problem of the care and handling of contagious disease, the proper observance of quarantine, is at present left to the good or ill will of the variously constituted communities with their different grades of intelligence, material environment, hygienic knowledge and moral sense.

The practical measures now in use in advanced communities do not adequately take care of the situation.

Placarding premises harboring a contagious disease neither keeps the inmates in nor does it keep visitors out. It is a good measure, but in itself not sufficient.

Initial inspection of cases reported, where in use, establishes a perfunctory quarantine, but does not and cannot maintain it.

Termination by disinfection after the patient and contacts have mingled with the public and spread contagion broadcast is like locking the stable after the horse is stolen.

The needs of the situation are for better laws where the laws are deficient; for action tending toward the rigid enforcement of quarantine by prompt reporting, placarding and establishment of quarantine of infected persons and premises.

The need—the greatest need—is for a stringent thorough-going personal inspection of quarantined premises and cases they hold every day, or at least every other day. The need is absolutely to keep the inmates in and the outsiders out during the quarantine period. Those ordered to live away from home must be made to stay away. The exclusion of those living on the premises in a different and properly separated part of the house, as prescribed, from the rooms occupied by the patient and attendant must be enforced at all times. The need is for supervision of the means of taking in supplies into the infected house and particularly the manner of removal of articles from the premises.

In brief, there is need for personal knowledge of each case, the respective district, its inhabitants and the conditions obtaining there; there is need for bringing this knowledge to bear on each and every phase of the contagious disease situation; there is need for a man to be constantly on the ground to study, observe, teach, watch, correct and enforce the observance of quarantine as above outlined.

THE ENFORCEMENT OF QUARANTINE IN CHICAGO

In the beginning of December, 1908, the contagious disease situation as pertains to scarlet fever and diphtheria, became threatening. Neighborhood epidemics were springing up in every section of the city. It was feared that the experience of 1907, when half of the entire city was enveloped in scarlet fever, would be repeated. One of the worst local outbreaks occurred in the south side of the city and originated from several cases of scarlet fever found in the "peeling" stage, in a parochial school.

From Dec. 15, 1908, to Jan. 26, 1909, thirty-six cases of scarlet fever were reported in rapid succession from an area comprising 144 city blocks. Conditions in other sections of the city were similar. I then proposed the quarantine plan now in force, of which the following are the outlines:

1. The city was to be districted, for purposes of adequate control, into more or less equal divisions, taking into account the extent of territory and the number and character of the population in the respective districts.

2. A quarantine officer and disinfector was to be stationed in each district.

3. It was to be this officer's duty to enforce the observance of quarantine, to have an intimate knowledge of every case and its environment, to hem it in and hedge it in so that it would not give rise to other cases, to know when it was ready for disinfection, and to disinfect same when ready.

4. He was to report daily as to the condition of his district, the number of current cases, the number of inspections, the number of disinfections, etc.

This plan was applied to the district above referred to. On Jan. 30, 1909, strict quarantine of all infected persons, premises and contacts, was instituted. House-to-house calls were made by our inspectors each day or every other day, as conditions required. Working members of the family in which contagious disease existed were compelled to stay away from the infected premises; those remaining on the premises were properly kept away from the patient and attendant. The delivery of milk and other supplies to the infected premises and the removal of the necessary waste were regulated in accordance with the quarantine regulations. Semipublic places, such as grocery stores, bakeries, meat markets, candy stores, etc., were warned against admitting any one from infected premises. Visitors were barred and excursions prohibited. Quarantine became a fact.

Where cases were ready for termination, patients and inmates, premises and belongings, were disinfected, and quarantine raised.

The results obtained were very gratifying, in spite of the newness of the task. In the next nineteen days, but one new case appeared, on February 2, and it is probable that the infection dated prior to the beginning of rigid enforcement of quarantine. On February 20 only twelve cases remained in the district.

This experiment was repeated and tried out in two other districts widely different in complexion and distantly separated. One of these was taken under control on February 24 with forty-eight cases of scarlet fever and diphtheria in it at the time. In a month the number of cases were forced down to nineteen, a reduction of nearly 60 per cent.

At the same time we quarantined another district with thirty-three cases in it. At the end of a month the number of cases current were fifteen, a reduction of over 54 per cent.

Following the above experiments and their results, the plan was put into operation over the entire city, and applied to all cases of diphtheria and scarlet fever. This plan will now be described in somewhat greater detail.

It is readily seen that absolute isolation of the patient is the keynote of the entire problem. Not all cases are similarly situated with respect to the immediate surroundings. Some of the cases are located in fine residences, others in flats, still others in hovels. All throughout it is a process of adaptation to environment and all throughout the essential of isolation is kept in mind.

The patient and attendant are put into one or two rooms at one end of the house or flat. This part of the house is separated from the other rooms in the house by having the intervening door locked and sealed, provided there is a separate entrance to them. They should also contain all the necessary household facilities such as water, toilet and cooking facilities. Here the patient and attendant, nurse or mother, as the case may be, are required to remain during the entire quarantine period. No one is allowed to enter their quarters except the

attending physician and the health officer, when necessary for the purposes of control. The body and bed linens are to be disinfected before removed, the garbage and house sweepings are to be burned or disinfected, in fact, all the details of the hygiene of the sick-room are under surveillance of an officer of the health department.

Where such ideal conditions obtain, the workers of the family are allowed to go about their business without any interference, providing however, that at no time is there any direct or indirect contact between them and the patient or attendant. The part of the house which they occupy is, as said above, separated by a locked and sealed door from the patient's quarters. Where the bath-room, cooking and the other facilities of the house are in use by the patient, the workers must arrange for the use of these facilities elsewhere.

But ideal conditions are not found everywhere, as every one knows. In many cases the construction of the flat or house will not permit absolute isolation as above indicated; the family may occupy a four-room flat with only one outside entrance, where such arrangements as above outlined are manifestly impossible. Again there may be other children in the family and the people too poor to employ a nurse. It may be said that the greater the difficulties in the establishment of good quarantine, the greater the necessity for it. It is no dead subject; it is not cut and dried; it requires the exercise of sound hygienic principle, common sense and tact. Where the patient cannot be perfectly isolated, we insist that the working members of the family should live away from home while the case is in progress. If they remain at home, they are not allowed to continue at their occupations. These are essentials that we absolutely insist on.

We not only center our attention and efforts on the persons of the patient and the other members of the family, but we are, in this work, concerned with the innumerable details of human life in so far as they have a bearing on this problem. In flat buildings it frequently happens that there is one toilet for the use of two families living on the same floor. In such cases, the well family is instructed to arrange for toilet facilities elsewhere in the building, and the members of the family under quarantine are to use the nearest toilet.

Another important feature to which I want to call attention is the particular effort that is made to protect the other children in the same family where there is a case in existence from infection. From the health and humanitarian points of view, it makes no difference whether the second patient bears the same patronymic or not—whether it is Smith or Jones. We are, in a way, more responsible for a second or third case in the same family, because we ought to have anticipated and prevented it. In diphtheria, the problem is partially solved by immunization, but in scarlet fever nothing short of removal or rigid separation of the well from the sick in the family proper will save the susceptible.

This is not fully recognized. We owe protection only not to others outside of the family, but also to the members of the afflicted family. To this end mothers are especially warned to beware of the dangers of combining the duties of nurse and housekeeper where there are other children in the family. The families afflicted with contagious disease are guided and helped through the trying period of the illness in every way possible.

We aim to do the work in a scientific and sympathetic way. While it frequently becomes necessary to be insistent and stern in order to protect the public health, no undue intrusion on the rights of the individual is practiced.

We recognize that the best results can be obtained by securing the good will and cooperation of those with whom our task lies. We try to make them conscious of the fact that they owe a duty to the community; to make them see their self-interest in the light of the community interest.

The correlative factors in this work, operating for or against it are the following:

1. Economic conditions.
2. Education.
3. Hospitalization.
4. Policing.

Economic conditions, poverty and its congener, ignorance, are by far our greatest opponents in this work. Rigid quarantine no doubt works a hardship on many poor families; it calls for a sacrifice of an altruistic character that many do not understand.

Education is our greatest ally. To bring knowledge to the ignorant and awaken a sense of duty in the careless is the first step. In a task of this kind, we can look for the full fruition of our work only when the poor and ignorant better understand their own interests in these matters and the well-to-do and well-informed have been sufficiently impressed with the necessity of giving thought to the interests of others. In this campaign of education the family physician occupies an important position. His efforts and influence should be freely given to the cause of health.

Hospitalization of contagious cases is, of course, the surest means of securing isolation of the patient. It is, unfortunately, impossible to always do that at present, both on account of the lack of adequate hospitalization facilities for contagious cases, and for the reason of an opposed public opinion to such a measure as universal hospitalization. It has, however, a two-fold bearing on the quarantine situation.

On the one hand, the rigid quarantine regulations induce many families to send the patients to the hospital; on the other hand, the fear of having the patient forcibly removed to the hospital in case quarantine regulations are violated makes them live up to these regulations.

It frequently becomes necessary to police the quarantined premises, when the people are careless and refractory and the danger of the spread of the disease is considerable. This always has a salutary effect. It convinces them that the department means business and they readily fall into line and are willing to learn and observe the regulations.

This system of quarantine enforcement in Chicago, as far as diphtheria and scarlet fever are concerned, has been in existence a year now. One year is a very short period for such an undertaking. The difficulties were many, and the means at hand, as far as money and men are concerned, were inadequate for the task in hand. Yet a considerable improvement in conditions was achieved, both as to the educational influence it had on the public, resulting in a changed attitude towards necessary health measures and a broader knowledge of the same, and also in its direct bearing on the morbidity of scarlet fever and diphtheria. This system of quarantine regulation and surveillance was inaugurated in May, 1909. It did not get well under way until about September. Here is a comparison of the number of cases reported during the twelve months preceding quarantine enforcement, with that following it:

COMPARISON OF NUMBER OF CASES REPORTED BEFORE AND AFTER QUARANTINE ENFORCEMENT

SCARLET FEVER

1908	May	301	1909	May	455
	June	287		June	382
	July	203		July	261
	August	173		August	216
	September	297		September	342
	October	606		October	514
	November	841		November	684
	December	914		December	686
1909	January	881	1910	January	668
	February	590		February	671
	March	644		March	692
	April	587		April	600
		6,336			6,191

DIPHTHERIA

1908	May	254	1909	May	378
	June	305		June	320
	July	255		July	268
	August	251		August	223
	September	341		September	327
	October	788		October	550
	November	880		November	719
	December	934		December	601
1909	January	745	1910	January	668
	February	522		February	443
	March	522		March	470
	April	485		April	527
		6,281			4,924

As to scarlet fever, we see that from May 1, 1908, to May 1, 1909, 6,336 cases were reported; in the following twelve months 6,191 cases were reported, a saving of 145 cases. This in spite of strongly pronounced epidemic tendencies; this in spite of the fact that a comparison of the cases reported during the calendar years, 1908 and 1909, shows that there were 5,305 cases reported in the former and 6,242 in the latter, showing a preponderance of 937 cases of scarlet fever in 1909.

In the case of diphtheria, the results obtained were still more gratifying. From May, 1908, to May, 1909, 6,281 cases were reported. From May, 1909, to May, 1910, 4,924 were reported, a reduction of 1,357 cases; and here also more cases have been reported during the calendar year 1909, than during 1908.

The proper observance of quarantine has now come to the fore as an efficient means to control the contagious diseases. It does away with the weak points in handling contagion in a large city. It helps do away with the leak and dribble of careless individual negligence which does the community so much harm. As a preventive measure, it has emerged from the realm of theory, and has now firmly established itself by virtue of actual experience, which showed its necessity and practical utility.

1400 West Taylor Street.

ABSTRACT OF DISCUSSION

DR. B. FRANKLIN ROYER, Harrisburg, Pa.: Dr. Cohen has outlined a type of quarantine which is ideal in a large city, but which is applicable only in cities or towns of considerable size. It is not always possible to have the kind of supervision and espionage kept up in the country districts and small towns which is practiced in Chicago. In such places we must rely more on educating the family itself. Too often, I fear, a quarantine officer placards the premises, instructs the people as to what they are to do, and walks away. If he is in a hurry he may not go into great detail; perhaps he may not himself be sufficiently trained, if he is a layman, to go into detail of complete isolation and explain the necessity for keeping up isolation until the termination of the case.

An idea was well brought out this morning in Dr. Hemenway's paper, and perhaps it would make a very strong point in any suit if violation of quarantine comes to that point, to be able to say that the family was fully instructed and that the instructions handed them were printed in full detail. The Pennsylvania Department of Health uses such a circular of instructions for each communicable disease. It includes details of isolation, describes the method for the disinfection of discharges, and at the conclusion of the leaflet an extract from the law is quoted. A similar extract from the law is printed on the placard. This plan not only instructs the householder, but offsets a plea of ignorance on his part. Physicians know what these circulars of instructions contain. It saves them a great deal of time and helps them in the work, and after all it is to them we must look for keeping up the domestic quarantine.

DR. SENECA EGBERT, Philadelphia: I think Dr. Royer will bear me out that in our great small-pox epidemics the plan of putting either one of the regular policemen or a special man sworn in as a policeman in the house in which the disease is, and keeping one there night and day, is a good one; that is, the plan of keeping the guard there, without allowing ingress or egress to those who might carry infection beyond the premises. Another thing is the necessity of common sense. There are a great many physicians who do not appreciate how valuable this is. You can make the routine disinfection and care of a room in a case of illness lasting two or three weeks very tedious and annoying. Boiling water can be had in almost any household, and most things that come from the room can be boiled with almost no trouble for the thirty minutes or the hour that is necessary for thorough disinfection. With a little bit of bichlorid solution and boiling water any household can accomplish the disinfection of dishes, clothing and the like, and with a little chlorinated lime or ordinary milk of lime in addition for the excreta, one has about all that is necessary. This simplifies the task of regular and persistent disinfection.

DR. I. D. RAWLINGS, Chicago: Dr. Cohen failed to mention a number of things I thought he would bring out. One thing is that the man who makes the first inspection, gives the instruction, gives out important literature (samples of which I supposed would be shown here under this paper), is a thoroughly trained medical health officer, who knows just exactly what instructions to give, exactly what to do, where to place placards, all the detail. He, while there, leaves instructions for the quarantine officer as to exactly what quarantine shall be established, says who shall be in that house, who shall go to work from that house, etc. This is all written down on a special blank and placed back of the red sign on the front door. The quarantine officer comes along the following day, removes this written statement of quarantine requirements, and in this manner knows exactly what instructions have been given the family by the medical inspector—has the full detail, and it is his duty to call every other day and see that the requirements are carried out.

We are living up religiously to our Rule 10, which says: "The members of the family who work out must (1) live in a part of the house remote from the patient and keep away from all persons coming in contact with the patient; or (2) room and board at another house; or (3) stop work and stay in the house.

DR. HYMAN COHEN, Chicago: It was my object in this paper to give a general review of the methods, not so much in detail, as in the broad sense indicating policies and lines of activity, or, rather, to indicate especially detail which I hoped would be brought out in the discussion. I want to answer some of the points made here by the speakers categorically. The statement that it is not possible to manage detail in the small communities is very true. It is not only not possible to do so in the smaller communities, but it is very often almost impossible to do so in the larger communities, where you work under the handicap of a limited appropriation. I have had to skip quite a good deal in order to come within the time limit; and many of the things mentioned as being left out are in the paper.

The repeated visits made and the oversight to see that the orders are followed out are just the points wherein the present system of quarantine inspection differs from the old system, in which the man would put a red card on the door and turn on his heel and walk off.

There are two essentials: information from the family, and then to give the family information as to managing the case; they want that; and the man must not leave the premises

on his initial trip before he imparts that information, and is satisfied that they fully understand the matter; and it frequently is necessary to get an interpreter when one is dealing with Italians and other foreign-born people who do not speak the language.

We have printed instructions. It would be interesting to find out how many of the hundreds given out are read intelligently and carefully. We are doing a great deal in the way of personal instruction of the family directly, or through an interpreter.

As to the physician's duties in case of contagious diseases, there is much to be said. There are all sorts of physicians in Chicago, as elsewhere. Some are antagonistic or careless; some are in sympathy with our work; but there is no one factor that is of as great importance in this entire situation as the physician factor. It is up to the physicians to "get next" to the progressive work that is being done in this line; for if they don't, they will be left behind; progress will be made in spite of their indifference.

We not only put a policeman at the door, but frequently two: one at the front entrance and one at the rear; and two means four, because they work in relays, night and day. It is important; it brings the people to a realization of the fact that we mean business, and it has a salutary effect on them.

Common sense and tact are the greatest factors. You cannot compel the members of a Chicago community, or any large community, to observe strictly any precaution they have never used before and perhaps have never heard of before. Many of these families have had a case of contagious disease for the first time; they do not understand the situation, and if you go at them abruptly you will lose out. This is where experience and tact come in. We try to have inspectors with common sense and education, so far as possible.

We allow nothing to come from the room without being thoroughly disinfected; and we supply bichlorid tablets; we make a solution in a wooden bucket right in the room, and not only are the linen bedding and the nurse's clothes disinfected, but also the bed-clothing, and the floor is mopped daily.

THE TREATMENT OF WOUNDS

A FIRST ARTICLE *

ALEXIS CARREL, M.D.
NEW YORK

In the actual condition of therapeutics, aseptic wounds generally heal in a few days. The more ambitious dreams of the surgeons of the pre-Listerian era have been fulfilled. Nevertheless, we have no right to believe that the treatment of wounds has reached its ultimate perfection. We must investigate whether or not it is possible to advance farther. In the treatment of wounds, we content ourselves by protecting the tissues against infection, and we leave to Nature the care of cicatrization. Would it not be feasible to act on the processes of reparation themselves and to activate them? The wounds which now heal in a few days could possibly be caused to heal in a few hours. The treatment of fractures would also be simplified. The development of methods for the stimulation of the growth of epithelial cells, for the inhibition or the activation of the proliferation of connective tissue, for the artificial production of osteogenesis, etc., would greatly improve the therapeutics of the ulcerations of the skin and of the lesions of peripheral nerves, bones and many other tissues or organs. This new evolution of surgery depends on the discovery, partial at least, of the laws of redintegration of tissues of mammals. Cicatrization and regeneration are the expression of the power to persist in its form with which all organisms are endowed. We are deeply ignorant of the nature of this function of redintegration. It is, as is the function of nutrition, a fundamental property of living matter. To know its nature is as impossible as to know the nature of life. Besides this knowledge would be useless. From a metaphysic standpoint it would be interesting to discover *why* a wound heals. But from a scientific standpoint, it is infinitely more important to know *how* it heals, because it would then be possible to find what stimuli start the complex mechanisms of the regeneration of the tissues. Therefore, the physiologic phenomena of cicatrization must be investigated. It is true that the power of redintegration escapes our methods of research. But the physico-chemical processes which this power, as a directing idea, coordinates and harmonizes in view of the morphologic reparation, can be brought into the field of experiment. We must, therefore, analyze the mechanisms which are instrumental in the cicatrization of a wound, the factors which modify their functions, the stimuli by which they are started, and the causes of their reciprocal cooperation to the common work. Perhaps it will become possible to use some of these agents for the artificial activation of the regeneration of tissues and the treatment of wounds.

MECHANISMS OF THE REPARATION OF A CUTANEOUS WOUND

Since many centuries all surgeons know the anatomic processes of the cicatrization of a wound. On the open surface, granulations appear, and, by their contraction, bring closer to each other the edges of the epidermis. Then the epithelial cells wander on the granulous tissue and a new epidermis is formed. These phenomena can be divided into four periods: quiescent period, period of granulous retraction, period of epidermization and cicatricial period.

The experiments on which this article is based were performed chiefly on dogs. The cicatrization of wounds obtained by resection of a flap of skin was observed. The resected flap was of geometrical form, rectangular, trapezoidal or circular. In order that the edges of the old epidermis might be easily seen, I used black animals or I stained the edges of the wound with India ink. It was then possible always to distinguish the new from the old epidermis, and to follow accurately the variations of the dimensions. The dressing consisted of talcum powder and gauze or warm paraffin. The wounds were kept as nearly aseptic as possible. When they became infected the results were discarded.

1. *Quiescent Period.*—The quiescent period extends from the time of the resection to the time of the beginning of the granulous retraction. During the first days the dimensions of the wound do not vary. If we represent graphically by a tracing the time of healing the successive distances between two points A and B taken on the opposite sides of a rectangular wound, the tracing during the quiescent period is horizontal. Suddenly it inclines downward. It is the beginning of the granulous retraction. Often the immobility of the edges of the wound during the quiescent period ceases rather suddenly; there is no period of transition and the active period of reparation starts immediately. The main characteristic of the quiescent period is the great variability of its duration. In some cases it lasts only one or two days, while in others it lasts four or five days.

2. *Period of Granulous Retraction.*—At the end of the quiescent period the edges of the wound begin to advance toward each other. The tracing of the con-

* From the laboratories of the Rockefeller Institute for Medical Research.

secutive distances between the points A and B, taken on the opposite sides of a rectangular wound, shows a sudden inclination downward. Progressively, the inclination of the curve diminishes and, after a few days, it is almost horizontal. The reduction in size of the wound is very active during the first days of the period of granulous retraction. Then it becomes progressively slower until it comes to a standstill. This fact was observed long ago. It was believed that the activity of the granulations depended on their age, while it depends really on the dimensions of the wound.

By measuring the rate of reparation of a rectangular wound, I found that it diminishes progressively from the beginning to the end of the period of granulous retraction. The rate when the wound is 60 or 70 mm. is about 9 or 10 mm. for twenty-four hours. When the wound is one of 40 mm. the rate is about 3 mm. When the dimensions of the wound are only 20 mm. the rate becomes very slow. In all wounds the rate becomes about zero when the edges have reached a distance of about 10 or 15 mm. from each other. It is therefore certain that these differences in the rate of reparation are functions of the size of the wound.

By observing on the same animals large and small wounds, I could see during the same period the larger wound diminishing with a much greater speed than the smaller wound. For instance, two rectangular wounds (Experiment 176) were made on the same animal. The transverse dimension of the one was 66 mm. and of the other 26 mm. During the first forty-eight hours of the period of granulous retraction, the larger wound diminished 20 mm. and the smaller 4 mm. On trapezoidal wounds, it was observed also that the reduction in size of the smaller side is very much slower than the reduction undergone by the larger side. On circular wounds, made on the same animals with cutting tubes 1 and 2 cm. in diameter, the same phenomena were observed. Many other experiments have been performed. It is certain that the *rate of reparation* of the granulous period is *directly proportional to the size of the wound:* that is, to the effort to be accomplished in order to bring about the redintegration of the parts. It must be noticed that during the period of granulous retraction, the redintegration of the skin of mammals follows the law discovered by Spallanzani on the salamander. If the tail of a fish or salamander is cut off near its base, the new part grows faster than when the tail is cut off nearer the tip. The new part which arises from the basal cut grows more rapidly at first and more slowly later. The rate of regeneration is proportional to the importance of the work to be done. It is remarkable that, on mammals, the reparation of the skin, which is brought about by a very different mechanism, obeys the same general law.

The period of granulous retraction plays a very important rôle in the healing of the middle-sized and the large wounds. Thus, a wound of 60 or 70 mm. can be reduced to one-third and one-fourth of its primitive size. A wound of 30 mm. can be reduced to one-half its size. The importance of the granulous period is less for the small wounds. The effort of the granulations on a wound of about 15 mm. reduces its dimensions to three-quarters or even less of its original size.

The end of the granulous period corresponds to the beginning of the epithelial wandering from the edges of the wound. For a wound of about 30 or 40 mm. the retraction becomes exceedingly slow and even stops completely when the distance between the edges has been reduced to 10 or 15 mm. When the wound is larger, the retraction stops often when its dimensions are still 20 or 25 mm. In that case the epithelial wandering is very slow and often the result is an ulcer.

It seems that the epithelial wandering on the surface of the granulations stops immediately their retraction. The epidermization not only coincides with the end of the period of granulous retraction, but it causes it. In the corner of a granulating rectangular wound I deposited a small square graft of skin. After a few days the graft was found surrounded by the normal skin of the edge and the wound had assumed again a perfectly rectangular appearance. This shows that the retraction stopped at the level of the graft, while it still went on in the other parts of the wound. In another case, the epidermization of the upper part of a large square wound was stimulated by a graft, while the lower part remained without epithelium. It was then observed that the distance between the India-ink-stained edges of the old epidermis was still diminishing in the lower part, while it increased in the upper part. The shape of the square wound became trapezoidal. Sometime after complete epidermization it became square again. It is, therefore, certain that the epidermization inhibits the retractive function of the granulations. When the epidermization takes place early, the scar is large and thin. When the epidermization is late, the granulations undergo a stronger retraction and the scar is thick and comparatively smaller.

The function of the granulous period is also to prepare the surface of the wound for the wandering of the epithelial cells. But it seems probable that its main rôle is to bring the edges of the wound to a certain distance—about 10 or 15 mm. in the dog. It is shown by the fact that if the wound is only 10 mm. wide, practically no retraction occurs. It does not occur because it would be useless, since at the distance of 10 mm. the next mechanism of the reparation, that is, the epithelial wandering, can take place easily, as will be shown later.

3. *Period of Epidermization.*—On a rectangular wound, the edges of which are stained with India ink, it is easy to detect the beginning of the period of epidermization. The new epithelium spreads at first very slowly on the surface of the granulations. It is difficult to locate exactly the free edge of the new epidermis. Nevertheless, by using paraffin dressing, it is possible to see with certainty in a few cases the edge of the wandering epithelium. The new epidermis is exceedingly delicate and a great many external factors interfere with its growth. The best medium for its growth is certainly coagulated fibrin, which can be obtained by using as a dressing paraffin of a certain consistency and melting-point.

The time of the beginning of epidermization does not depend on the age of the wound but on its dimensions. If the wound is large, the epidermization is tardy. It occurs very much earlier when the wound is smaller.

By measuring the distance between two points taken on the free edge of the new epidermis of a rectangular wound, it was found that the growing of the epithelium is exceedingly slow if the distance is more than 12 or 15 mm. But if the edges are located less than 10 mm. from each other, the epithelium wanders more quickly on the granulations. When the free edges of the epithelium are closer, the rate of cicatrization is very much faster. I found, in one case, a rate of 2.5 mm. for a distance of 5 mm. The curve representing the positions of the two points runs at first almost horizontal and progressively inclines itself downward with an accelerated rate.

When at the end of the granulous retraction of a large wound, the edges of the old epidermis are still at a distance of 20 or 25 mm. the new epidermis cannot spread on the granulations and the cicatrization of the wound comes to a standstill.

It seems that the time of the epidermization and its rate depends mainly on the dimensions of the wound. This point has been ascertained by several other sets of experiments.

By observing trapezoidal wounds it was found that the smaller side about 8 mm. wide was completely epidermized while the larger side about 20 mm. wide presented an epithelial band of about 2 mm. along the edges of the old epidermis. On irregular wounds the epidermization begins always on the points where the edges are closer to each other. In lozenge-shaped wounds the epidermization begins in the acute angles and the wound becomes an ellipse. On several kinds of trapezoidal wounds it was always found that the epidermization begins sooner and spreads more quickly between the points which are separated by the shortest distance.

Therefore, it appears that the law of reparation by epidermization is absolutely different from the law of separation by granulous retraction. *The rate of the epidermization is inversely proportional to the dimensions of the wound.* It is very slow when the distance between the edges of the wound is more than 10 or 15 mm. The maximal activity of the epidermization seems to take place when the cicatrization is nearly complete, and when the edges of the new epithelium are very close to each other.

4. *Cicatricial Period.*—The dimensions of the scar can easily be measured when the edges of the old epidermis are stained with India ink, or when the animal is black. It was found that the scar of a large wound is comparatively smaller than that of a small wound. On the same animal, two wounds of 66 mm. and of 26 mm. were observed. The 66 mm. wound gave a scar of 22 mm. and the 26 mm. wound a scar of 13 mm. The scar of the large wound was only one-third the size of the wound, while the scar of the small wound was one-half the size of the wound. If the wound is still smaller, 10 or 12 mm., the scar is almost the same size as the wound. This is the natural result of the law of granulous retraction.

The evolution of the scar is very slow and the cicatricial period of a wound very long. As soon as the epidermization is completed, the distance between the points A and B of the edges of the old epidermis grows greater. The tracing shows a slight movement upward of the line representing the different values of the distance A and B. The points A and B have a tendency to go back to their former position. This progressive enlargement of the scar lasts for a long time and its result should be a complete redintegration.

The mechanisms which are instrumental in the cicatrization of a wound are coordinated in such a way that the reparation is continuous and progressive. Nevertheless, the reparation presents phases of maximum and minimum activity during which the rate is higher or lower. During the quiescent period, the end of the period of granulous retraction and the beginning of the period of epidermization, the rate of the reparation is slow. It is maximum at the beginning of the period of granulous retraction and at the end of the period of epidermization. The two mechanisms are adapted to the healing of small and middle-sized wounds, the width of which is not over 40 mm. In a wound 30 or 40 mm. in width or smaller, the retraction of the granulations is very efficient, since it can quickly bring the edges to a distance of 10 or 15 mm. This distance is very favorable to the epidermization. Therefore, at the same time when the rate of reparation by granulation becomes very slow, the epidermization starts and the reparation goes on without interruption, although by a different mechanism. But if the wound is larger, 60 or 70 mm., the retraction of the granulations cannot bring the edges to the minimum distance. They remain at a distance of about 20 mm. and the reparation comes to a standstill because the epidermization cannot take place easily under these conditions. The mechanisms are very efficient for the healing of the injuries to which the animals are exposed in their every-day life. But they do not work as satisfactorily for the larger wounds.

VAPOR ANESTHESIA APPARATUS

JAMES T. GWATHMEY, M.D.
NEW YORK

In 1905 I first presented my apparatus for vapor anesthesia to the medical profession. At that time it seemed quite complicated. It consisted of three bottles connected by tubing, one of which was for ether, one for chloroform and the other being a bottle containing hot water or hot neutral oil for warming the vapor, and having a tube through which the vapor was delivered to the patient. Each bottle was provided with a stop-cock, and a mixture of chloroform and ether could be given. The ether bottle contained a drum for assisting in vaporizing the ether. I have perfected the different parts and

Fig. 1.—This shows the three bottles of the vaporizing apparatus, with the single stopcock. The figure at the right below shows the tubular frame of the mask through which the vapor passes to the gauze covering. The tube at the left below is used in delivering the anesthetic in operations about the mouth or throat in which the mask cannot be used.

now present a simplified apparatus consisting of three bottles with one stop-cock. The drum in the ether bottle has been modified (as suggested by Dr. Charles E. Boys, Kalamazoo, Mich.), so that it now vaporizes all of the ether, and it does not necessitate refilling the bottle as often as before. A small bottle holding 10 drams of chloroform has also been placed within the chloroform bottle. This is enough chloroform for a long operation. The end of the tube in the chloroform bottle has been closed and a number of pinhole perforations made at the bottom of this tube, so that it is impossible to waste the chloroform as the air passes through. The last improve-

ment has been to place around the mask a rubber covering which confines the vapor and assists in making the anesthetic more manageable.

If one ounce of the oil of bergamot or terpineol is placed with 3 ounces of water in the hot-water bottle, the odor of ether or chloroform will be so disguised that the patient will be unable to distinguish when the anesthetic is turned on, and consequently no resistance or asphyxial symptoms present themselves in going under the anesthetic. Then again, it is much pleasanter for the surgeon, nurses and others in the room to smell the oil of bergamot or terpineol than to be constantly inhaling the odors of ether and chloroform.

At any time the anesthetist can give either chloroform or ether, or any combination of the two, by simply turning the single stop-cock, the change being made in less than a fraction of a second, all of the vapor passing through the third bottle, usually filled with hot water, and terpineol or a hot neutral oil. Unquestionably a smaller amount of anesthetic is used with this apparatus, or with some similar apparatus, than with any other method now known. It has been used constantly in some of our largest hospitals since 1905, with increasingly gratifying results in the following particulars:

1. A smaller amount of anesthetic is used. In a chloroform anesthesia, in which ether was contra-indicated on account of an ulcer in the stomach, I used 2 drams of chloroform for a twenty-five-minute operation. Two or three ounces of ether with one to two drams of chloroform per hour is the usual amount used.

Fig. 2.

Fig. 3.

Fig. 2.—Illustration of mask one-third size.
Fig. 3.—Illustration of rubber covering for mask, which helps to prevent cooling and waste of the anesthetic.

2. The technic can be acquired with less danger to the patient than with any other anesthetizing method. In getting the patient entirely under, with this apparatus alone, excitement is usually absent, or so slight that it is unobjectionable.

3. In over 90 per cent. of the cases unpleasant after-effects are entirely absent.

4. A continual narcosis is always maintained, as we know exactly what per cent. the patient is getting at all times, and in addition the gradations are easily and readily made by moving the one lever according to the degree of narcosis demanded by the operation. An intermitting narcosis, which is wrong in principle, is thus avoided. It is especially indicated for nose and throat operations, and is the apparatus for mastoid operations. The anesthetist can maintain primary anesthesia, moving backward and forward between what is commonly known as the second and third degree of anesthesia, without once arousing the dangerous vomiting center. All of the vapor, being warmed, is more respirable, reducing the after-effects and increasing its safety as regards life. With this attenuated vapor, an infant three days old can be safely anesthetized and an alcoholic can be easily kept under, after reaching the surgical stage. All patients can be narcotized within five minutes, and with this warmed vapor, the kidneys, heart and lungs are never seriously affected.

In order to discover the value of passing this vapor through hot water, the following tests were made by Dr. Chas. Baskerville, professor of chemistry, College of the City of New York:

1. Pure oxygen was passed for seventeen minutes through 4 ounces of anesthetic ether, the resulting mixture passing through the hot-water bottle with the water at 60° C. The first 10 c.c. of distillate were collected. The ether used in this test had given a pronounced aldehyd reaction when allowed to stand over potassium hydroxid for six hours, but the distillate obtained in the above experiment gave only a slight response.

2. An experiment was made, using water at 40° C. and applying external heat to the water-container sufficient to insure vaporization of the ether. The ether distillate obtained under these conditions, gave a negative reaction for aldehyd. It will appear from these results that the aldehyd is removed when ether vapor is passed through water in the neighborhood of 40° C., and that the aldehyd content of the ether passed through is considerably diminished and its toxic value is especially lessened, when the water is kept at a temperature in the neighborhood of 60° C.

The vapor apparatus may be used in combination with a vacuum water pump, similar to the one used by dentists for removing blood and secretions from the mouth and throat in operations about those parts, in which it is necessary to remove the mask. The anesthetic vapor in this instance is administered through a metal tube attached to the delivery tube of the apparatus. I have improved the pump by the addition of an adjustable connection that can be attached to any hydrant or tap.

124 East Sixteenth Street.

EYE-STRAIN A CAUSE OF EXOPHTHALMIC GOITER

GEORGE M. GOULD, M.D.
AND
A. C. DURAND, M.D.
ITHACA, N. Y.

Exophthalmic goiter, it is said, is, or may be indicated by four symptoms, tachycardia, exophthalmos, goiter, and tremor. Tachycardia is usually held to be the early, leading, or primary symptom, the other three trailing off in relative unimportance. Indeed, any one or two, perhaps three, of the four may be absent, and yet the real morbific Proteus be present, concealed and yet pathogenic by means of the one or two remaining.

Pathology of a serious or rational standing has really nothing to offer as to the cause and nature of the disease. The oculists have kindly shoved the problem off into the far country labeled "ductless glands," and it has been quizzically suggested that the exophthalmic principality of the quadruple-crowned and loosely joined grand-duchies, owes all its independence to a wondrous little, and little wondrous, "muscle of Müller," situated at the orbital fissure. How it is possible for these tiny fibers by contraction to produce the distortion of a huge, or of any degree, of exophthalmos, with its attendant signs and symptoms, what may be the physiologic function of this muscle in the first place, and consequently what is its morbid function, how the thyroid secretion can execute such a task—all these, and more, raise the corners of the mouth of the genuine scientist. Indeed, the illogicalities of the symptom-complex and of the group-name

illustrate the tendency in all of us to clap an inappropriate name down on a lot of unknown facts, and "stand pat" in the comforting delusion that something has been done as regards etiology and therapeutics.

Now the forgotten *reductio ad absurdum* of this pathologic pathology lies in the fact that each day we all have patients presenting one, if not two, of these four "typical" symptoms, and we never dream of Dr. Basedow, or of Dr. Graves, or of Dr. Exophthalmic Goiter. Far more startling and undreamed of is the fact that we oculists who are also refractionists, have long been curing our patients who exhibit these symptoms, when they are presented singly, and doubtless also when in twos and threes. Nothing is more certain than that the eye-strain of ametropia often causes tachycardia, often causes tremor, often both combined. One of us has already reported a number of cases of tachycardia cured at once by the correction of ametropia, and we could add others. To these might be added cases of tremor. The coexistence of lateral spinal curvature must, and does, probably, add a causative factor, and certainly needs scientific study at the hands of serious-minded pathologists. The essential thing is to reach the precedent functional or physiologic cause of the late morphologic symptoms. In this respect all of our pathology is glaringly in fault and needs revolutionizing. When we find intense and long-continued eye-strain preceding the appearance of either of the three chief symptoms we at once get a glimpse into their possible origin, and especially if one after another is developed seriatim. This more particularly holds good if the exophthalmos is monocular.

What may be the mechanism whereby the symptoms are produced by eye-strain is another matter, and does not, at first, concern the clinician, or even the sensible pathologist, so much as the establishment of the fact. How tachycardia may be caused by eye-strain, and how tremor may result from eye-strain or scoliosis, is easily seen, but how exophthalmos is produced by eye-strain is not so readily understood. Less easily still may one explain the ocular origin, if such exists, of goiter.

Among a considerable number of cases that we have had which showed the causal relation of eye-strain and "Graves' disease" is the following:

July 15, 1907, Miss L. R., from Ohio, consulted us on the recommendation of Dr. I. She had been suffering from headache, lassitude, and intense pain in the back of the neck for a year, and the left eye began protruding about eight months previously, becoming more pronounced up to two months prior to her visit. No goiter existed. The pulse-rate was about 105, but variable. An oculist, some two months previously had ordered glasses, after three days of mydriasis, R.E. sph.+ 1.00!!! The static error of refraction, however, we demonstrated to be as follows:

R.+sph. 1.50,+cyl. 0.50, ax. 90°=20/30
L.+sph. 1.25,+cyl. 0.50, ax. 90°=20/30

For the ten or twelve hours during which the eyes were under the mydriatic the exophthalmos of the left eye disappeared almost completely, and this eye would not have seemed different from its fellow. When the cycloplegic wore off the next day the exophthalmos returned.

This temporary recession of an exophthalmic globe under mydriasis had occurred several times in our practice before, but in Miss R.'s case the sequel was different; for during the six months following the securing of the spectacles correcting her ametropia the exophthalmos slowly and finally completely disappeared.

Graefe's sign did not disappear under mydriasis, but in September, 1910, it was not present, and, so far as the exophthalmos is concerned, no difference was to be detected between the two eyes.

Of course the headache, neck pain, tachycardia, etc., passed away at once with the exact ametropic correction. At the last visit, also, all amblyopia had disappeared, the acuteness of vision being perfect. The ophthalmoscope revealed considerable ophthalmovascular choke, but the most decided symptoms of this disease were not present.

Nothing is needed to demonstrate the fact that in this case the cause of the exophthalmos and tachycardia was eye-strain. Whether goiter would, in time, have been added to the two other symptoms of hyperthyroidism, cannot now be asserted or denied.

The conclusion is suggested that, as multitudes of goitrous patients have no tachycardia or exophthalmos, the goiter symptom is somewhat independent or secondary. It appears more than suggested that a common, if not the chief, cause of so-called exophthalmic goiter is eye-strain. Probably the tachycardia is the first of the ocular reflexes instituted, followed by the exophthalmos, as, chiefly, a secondary vascular phenomenon. (The exophthalmos of choking, or strangulation, or cervical compression, is suggestive.) It is not beyond comprehension that heightened blood-pressure may induce goiter, although the neurotic origin seems more sensible. Lastly, it hardly needs mention that the only cure in such cases must be through prevention, stopping the long preexisting eye-strain by accurate correction of ametropia. Perhaps, rarely, may a cure be expected when decided exophthalmos (and especially of the *two* eyes) has been established.

For twenty years or more one of us (G. M. G.) has been urging the profession to make a differential diagnosis in cases of headache, migraine, neurasthenia, dyspepsia, etc., by cycloplegia. Not one has cared enough about the matter to carry out this simple test. Consequently, it would probably be of little use now to advise mydriasis as a method of testing whether the early symptoms of exophthalmic goiter are due to eye-strain. But why not?

ELEPHANTIASIS OF SCROTUM AND PENIS WITH OPERATION

RAYMOND RUSS, M.D.
SAN FRANCISCO

The following case history is presented because of the rarity of this condition on the Pacific coast. Tropical diseases about the Bay of San Francisco are rapidly increasing in number, and the practitioner must be on the constant lookout for them.

History.—A young man, aged 30, single, a cigar-maker by occupation, was referred to me for extensive swelling of the penis and scrotum. This patient had been in Mexico in 1900 for three months, and in 1902 for a period of six months. There was no other history of tropical exposure. He stated that the disease appeared insidiously and had never been accompanied by pain. There had never been periods of chill, high temperature or diaphoresis, but he said that at times there had been local heat in the scrotum, although unaccompanied by general fever.

Examination.—The scrotum was found to be very large, about the size of a small cocoanut. The penis presented an edematous collar, 4 cm. in width, just back of the corona glandis. On palpation the testes were found to be of normal size and freely movable within the scrotal sac. The size of the scrotum was due to an extensive involvement of its structure. The tissue was hard and brawny to the feel; it did not pit on pressure and was dark red to a light brown in color in places. The swelling was most noticeable directly under the penis, and extended to within 4 cm. of the perineum in the median raphe. The tissue resembled more than anything

else the hard, brawny induration which so frequently occurs in the skin of the neck after extensive operation on its glands for malignant disease. There was no edema in any other portion of the body and the patient stated that there had never been any. One year ago the patient was operated on for adherent prepuce. This was only partially dissected away and the corona glandis was but partly clear at the time of my examination. At the frenum was a tumor mass of hard tissue closely resembling that of the scrotal involvement and about the size of a nickel, being possibly slightly thicker. This was made up of the adherent prepuce, and the mucous membrane of the glans penis was not involved. Back of the corona glandis there was a constriction of tissue of about 0.25 cm. in width, and above this point for at least 4 cm. the tissue was swollen and redundant, presenting the characteristics of the scrotal involvement. The femoral glands were not perceptibly enlarged. The patient's general health had always been good. The heart and lungs were normal. Tuberculin reaction negative.

This patient was referred to Dr. Herbert Gunn, who confirmed the clinical diagnosis of elephantiasis, and made several examinations for filaria, all of which were negative. The patient was placed on a hydragogue cathartic and the scrotal tumor was soon considerably reduced in size, but the skin induration was unaffected.

Operation.—September 9, 1910, at University of California Hospital the patient was operated on. I was fortunate in having present at the operation Dr. P. S. Rossiter, United States Navy, who has had a large experience (eighty-two cases) in the operative treatment of this disease in Samoa. The technic developed by Dr. Rossiter was carefully followed. With the patient in the lithotomy position, the lines of incision on the scrotum were outlined. They were made in perfectly sound tissue, meeting above on the under surface of the penis, then sweeping out in a slight curve to within 1 cm. of the perineum. The testes being well lifted, the tumor mass was grasped in the hand and rapidly cut away along the lines which had been marked. The testes were found to be normal. As the remaining lateral flaps were small, coaptation was obtained with some difficulty by means of tension sutures of chromic gut and the incision carefully united by a continuous horsehair suture. With a sound in the urethra the tumor mass near the frenum was removed by free incision and the prepuce dissected away from the corona glandis. Incision was then made transversely about and high up on the body of the penis, and the portion of involved skin between this point and the corona glandis removed. Sound skin was then brought down and united at the sulcus by means of four tension sutures of silkworm gut and a continuous suture of horsehair. The wounds healed kindly and the patient was discharged from the hospital on the eighteenth day.

240 Stockton Street.

A CASE OF CHRONIC APPENDICITIS SIMULATING NEOPLASM

W. H. BOESE, M.D.

Assistant Pathologist, Lebanon Hospital; Assistant Physician, University and Bellevue Clinic

NEW YORK

The following case is reported on account of the unusually large circumscribed development of inflammatory tissue, resembling a new growth. Although such a formation has been seen in chronic inflammation of the Fallopian tube, in the appendix it has not been reported to my knowledge.

History.—Miss D., aged 47, was admitted to the surgical service of Dr. Henry Roth at Lebanon Hospital June 2, 1907. About one year before admission to the hospital she had an attack of acute appendicitis. Soon after this attack subsided she noticed a mass in the right lower quadrant of her abdomen. This gradually increased in size. She lost 20 pounds in weight in one year. Examination revealed a tumor occupying the entire lower right quadrant of the abdomen, extending up to the level of the umbilicus and about one or two inches beyond the median line.

Operation.—This was performed by Dr. Henry Roth on June 3, 1907. On opening the peritoneal cavity a large mass presented itself with a shining, yellowish-brown surface and cystic to semisolid consistency. Its upper surface was attached to a broad band of omentum. There was an adhesion to the rectum. The tumor was intimately attached to the caput coli at the point corresponding to the base of the appendix. The mass was freed from the cecum and removed. In doing this there was an escape of very foul-smelling pus from the tumor through an opening at the point of its attachment to the cecum. The cecum did not show any evidence of involvement and, with the exception of denuded serosa and a small opening at the junction of the longitudinal bands, was normal in appearance. There was no evidence of any other growths or enlargements in other parts of the abdomen or body.

The patient died six days later, within a few hours after onset of symptoms of peritonitis, probably owing to failure of suture line in the cecum. Unfortunately a necropsy was not allowed.

Pathologic Report.—The tumor mass was oval, 19 cm. long, 11.5 cm. broad and 5 cm. thick. In the upper part, where it was attached to the cecum, and connecting with the lumen of the cecum by an opening about 0.5 cm. in diameter, was an oval abscess cavity about 6 cm. by 8 cm. by 4 cm. This cavity was filled with thick, yellowish pus, with a very offensive odor. Below the abscess cavity the tumor was one smooth, firm mass.

Sections were taken from four different locations. Dr. James Ewing of Cornell University was kind enough to go over the data and specimens with me. The following is his report of the more detailed findings:

"Sections from four portions of the tumor show that the growth is composed of fat tissue in various stages of edema and degeneration, a great many dilated veins, many large arteries and arterioles, many very cellular capillaries, considerable new connective tissue containing lymphocytes, lymph nodules, and plasma cells, and in certain areas diffuse infiltration with polynuclear leukocytes with some fibrin. There are also some outlying lobules of normal fat. None of the fat tissue shows any evidence of a tumor process, but rather of edema, mucoid degeneration, and invasion with an excessive number of small cellular blood vessels.

"In some areas about the numerous veins are broad sheaths of spindle cells with nuclei rich in chromatin. These show some of the features of a spindle-cell sarcoma, but are more satisfactorily explained as the result of chronic productive inflammation. Likewise, there are areas in which the small vessels and capillaries are so numerous as to suggest an angiosarcoma, but these appearances are probably the result of unusual cell multiplication in old granulation tissue. The typical structure of lipoma or liposarcoma is entirely wanting. The presence of diffuse suppurative inflammation in one large area, of much new inflammatory connective tissue, and of many lymphocytes, lymph nodules and plasma cells with granulation tissue, shows that the entire process is inflammatory and offers an explanation of the structures simulating a neoplasm.

"Therefore, the diagnosis may be given of chronic appendicitis and inflammation of the mesentery, with tumor-like growth of inflammatory tissue."

527 West One Hundred and Forty-Third Street.

Dyspnea in Pleurisy.—Dyspnea is a very characteristic symptom of pleurisy. It is most urgent in those cases in which the exudation occurs most rapidly and it is astonishing the amount of fluid which a pleural cavity may contain without causing much distress of breathing, provided that it takes place gradually. There must, however, be some other explanation than the mere slowness of the exudation, as there are cases in which, even in spite of rapid effusion, the breathing remains unembarrassed. These cases give less anxiety, as the presence of urgent dyspnea is always a grave indication. —F. de H. Hall, in the *Practitioner*.

Therapeutics

HYPERTHYROIDISM (GRAVES' THYROID DISEASE)

When a child grows tall very rapidly, especially about the age of puberty, the thyroid is at least very active, or actually hypersecreting. The bone formation is rapid, and the epiphyses unite with the long bones at an earlier age than in children who grow more slowly. A young girl who has too much thyroid secretion is likely to have profuse or too frequent menstruation.

In not a few instances, during acute disease in which the heart becomes very rapid, the cause is not the disease, but the disturbance of the thyroid, or a mild thyroiditis, that is present.

In 1835, Graves, of Dublin, first described the disease with which his name is often connected. In 1840, Basedow, of Germany, again described the same affection. The most-used name of the disease, "exophthalmic goiter," is a misnomer and should be discontinued, as we may have this disease without exophthalmos, and exophthalmos may occur without other symptoms of this disease. One of the two names at the head of this article is preferable, although proper names are objectionable for many reasons.

The greater the blood-supply and the greater the amount of simple hypertrophy, the nearer comes the thyroid gland to the condition of hyperthyroidism. The greater the amount of colloid material with formation of cysts, the nearer is the gland to what is known as ordinary goiter. The greater the amount of connective tissue and fibrous tissue development, the nearer comes the gland to undersecreting, sufficiently to cause myxedema.

In a beginning simple goiter, small doses of iodin may be of benefit, and iodin may be of benefit in the first stage of an exophthalmic goiter, the thyroid gland enlarging because it is short of iodin. In such conditions, the administration of small doses of iodin are of benefit, and a large thyroid, under such treatment, will often become smaller and the early symptoms of Graves' disease be inhibited. Such a gland, however, may be exceedingly susceptible to iodin, and a little iodin may precipitate all the Graves' symptoms. Or, the patient and the thyroid may stand small doses of iodin, while large doses would positively do harm, and are almost invariably inadvisable, as tending, sooner or later, to add the iodin cachexia to the thyroid disturbance. The iodin administered for this purpose is preferably in the form of an iodid, and perhaps best the sodium iodid. From 0.05 or 0.10 gm. (from 1 to 1½ grains) given from one to three times a day, is sufficient for saturating the thyroid with iodin and exciting its normal activity. Iodin has been used as an ointment, rubbed into the neck in the thyroid gland region. This, however, is generally inadvisable. The amount that will be absorbed is uncertain. Iodoform, in susceptible patients, placed on some absorbing surface, may cause iodin poisoning and symptoms of hyperthyroidism.

If during the administration of either iodin or thyroid symptoms of hypersecretion of the gland develop, the treatment is pernicious and should be immediately stopped. In fact, in any enlargement of the thyroid the administration of thyroid substance should be tried with great care lest the gland be stimulated to the condition of Graves' disease.

There is no justification for giving large doses of thyroid extract to a patient with a goiter with the expectation of diminishing it in size. It may be thus reduced in size, but the symptoms caused by such thyroid feeding should prohibit its use to that extent. The injection of iodin into goiters is not justifiable, and the attempt to diminish the size of the goiter with *x*-ray treatment is of questionable value. While the gland may be thus reduced in size, the skin is caused to become adherent to the underlying tissues, and any future necessary operation becomes much more serious than when the *x*-rays have not been used.

When any treatment is undertaken to diminish the size of the thyroid, its frequent variations in size without any treatment must be taken into consideration before deciding that such treatment was beneficial.

With these preliminary considerations we are better prepared to study "exophthalmic goiter." Its causes are any of the stimulants of the thyroid gland which have been named as stimulants in the previous article. It is suggested that in some instances exophthalmic goiter has followed some previous general infection, the gland having been first stimulated by such infection and then has continued its activity. Such a cause is probably rare, as sclerosis and subsecretion of the gland are much more likely to follow such irritation. The disease occurs four times as frequently in women as in men and most frequently between the ages of 20 and 40.

SYMPTOMATOLOGY

This disease or condition is well studied by dividing it into four periods: first, the prethyroid period; second, that of incipient symptoms; third, the period when the symptoms are all actively present, the stage of exacerbation; and fourth, when the symptoms of the disease tend to decrease, or the stage of defervescence. While deaths do occur from the disease itself during its exacerbation, it is probably rare. Death, however, often occurs during hyperthyroidism from some intercurrent affection or necessary operation, or from an operation that unfortunately must be done on account of serious symptoms, but has been deferred too long.

1. Rapid development of hyperthyroidism is doubtful, although it has long been stated that it may develop rapidly after some mental shock. Almost invariably careful questioning will show that there were plenty of signs present of hypersecretion of the thyroid. Highly neurotic patients, especially women with uterine irritations, as caused by inflammation or displacements are liable to the development of this disease. Recurrences of tremblings, palpitations, sleeplessness, vasomotor disturbances, and inexcusable loss of weight are signs that this gland could readily become so stimulated as to produce the picture of hyperthyroidism. Any of these conditions may be but short-lived, but if frequently repeated, they show a tendency to hyperactivity of this gland.

2. The actual symptoms of a developing Graves' disease are, primarily, an increased rapidity of the heart, some enlargement of the thyroid, and nervous irritability. These symptoms the patients often themselves note, perhaps not the enlargement of the thyroid, but questioning will often disclose the fact that they do not like collars or laces tight around the throat.

If in doubt as to whether these symptoms (especially if the thyroid apparently is not enlarged) are due to hypersecretion of the gland and are symptoms of beginning Graves' disease, the administration of a thyroid tablet (3 grains) once a day, will in five days at least, clear up the diagnosis. If the patient has increased thyroid secretion, every symptom will be greatly inten-

sified. If these symptoms are not intensified, the patient is not beginning an exophthalmic goiter.

3. The three prominent symptoms of an established Graves' disease are exophthalmos, enlarged thyroid, and palpitation of the heart. The most constant of these three symptoms is palpitation, and the next most constant is enlargement of the thyroid. The exophthalmos is frequently absent, and often is present in but slight degree. Exophthalmos may be present with an enlarged thyroid without palpitation. This combination, however, is infrequent, and the gland is not really hypersecreting. Rarely but one eye is affected. The forward projection of the eye-ball is probably due to dilated blood-vessels at the back of the orbit, as the exophthalmos disappears after death. The thyroid may be enlarged as a whole, but often only half of it is enlarged, and it varies in size from time to time, causing varying sensations of pressure. Part of the gland may increase its colloid material and even show cystic degeneration while the rest of the gland may continue to hypersecrete.

Palpitation is almost always present more or less persistently, lasting sometimes for weeks, and under the same conditions at the same rate. In other words, a patient who has a palpitation of 130 in the office during examination of the heart may be found for weeks, under the same conditions, with the same frequency of heart rate. No other disease or condition will allow a patient to walk around and attend to his or her business, eat, drink, sleep, and even be merry, with a heart-beat of from 120 to 140, and not recognize that he or she is suffering from palpitation. Any other cause for such a rapid heart will always cause dyspnea, more or less cardiac distress and actual disability. Sometimes the pulse is irregular, rarely intermittent. Often it is a pretty good pulse, even at the rapid rate. The heart is generally hypertrophied, especially the right ventricle, and later in the disease it may become dilated. There may be insufficiency of the valves on account of cardiac enlargement, but there is no valvular lesion. The future danger to the heart is that of a myocarditis. The arterial pressure is often low, but may be normal, and it is occasionally higher than normal. One of the serious dangers in the radical cure, *i. e.*, by operation, of this disease is that the operation is not done until myocardial weakness has developed. The carotid arteries pulsate to the point of throbbing and the thyroid arteries are dilated and also throb. This pulsation in the neck is exceedingly annoying to some of these patients. Aneurysms of the thyroid arteries often occur, giving all sorts of roarings and murmurs in and around the region of the gland.

The fourth most frequent symptom of Graves' disease is tremor. It is almost constantly present, may be of the hands alone, often of the tongue, and it may even be difficult for the patient to hold the head still, especially when being examined.

Other symptoms that may be present are a cough, due to the pressure of the thyroid and due to large blood-vessels in the throat, especially in the lingual tonsil region. These pressures and dilatations cause tickling. Diarrheas may occur, and sometimes nausea and vomiting; often severe headaches and insomnia are symptoms. There are vasomotor ataxias, such as hot flashes and then a feeling of coldness, and one may feel the patient's hands or face at one time cold, or hot, and in four or five minutes they feel the opposite.

Another important symptom of the disease is loss of weight, which is almost constant and has often progressed considerably before the patient comes to the physician; but there is always a limit to this loss of weight, as it does not seem to be continually progressive.

Early in the history of the disease the patient often sweats readily; sometimes has dripping perspirations. This, however, is by no means constant, and is probably due to the vasomotor disturbance. Leg and muscle weaknesses, and sometimes edema of the feet and ankles occur. This is entirely due to a weakened circulation. There may be polyuria, and sometimes an albuminuria, which perhaps represents passive congestion of the kidneys from weakened heart, and occasionally there is glycosuria.

The eye symptoms are characteristic, and the different signs are known by the names of the men who first called attention to them. Names are confusing, and it is unnecessary to quote them. The characteristic signs of the exophthalmic eye are (1) the inability of the upper eyelid to follow the eye-ball on looking down; (2) the unusual amount of sclera disclosed above the cornea caused by retraction of the upper lid when the patient is looking forward; (3) the difficulty or actual inability of the patient to hold the eye in a position of convergence. There may also be involuntary winking and tremor of the eye-ball. There may be, from the pressure, an obstruction of the mouths of the tear-ducts, and the tears may flow down the cheek, although the eyes may become dry.

The skin is generally thin, soft, and moist, and as the blood-vessels of the surface are more or less dilated, perspiration is generally easily caused by the least nervous excitement. There is more or less diminished electrical resistance of the skin, which is perhaps due to the overfilled blood-vessels on the one hand, and to the increased central nervous excitability on the other. Pigmentations of the skin are found on different parts of the body and not infrequently on the eyelids. Sometimes there is falling of the hair, or it may become prematurely gray. There may be browning of the skin, not dissimilar to what is seen in pernicious anemia or in Addison's disease, or there may be vitiligo. There may be all kinds of eye, ear, and head symptoms.

4. The duration of the disease may be from two to ten years or more. If the disease is to end in death, the complications which bring this about are most frequently myocarditis, diabetes, or a progressive muscular debility and neurasthenia. A pernicious anemia may also be a final outcome. Severe nervous complications may develop, but are rare, such as melancholia, mania, or chorea. If active thyroid disturbance has continued for more than five years, the chances of complete recovery are small, as serious complications have generally occurred. Those patients who recover generally do so in from two to three years by a general amelioration of the symptoms, with a tendency, as previously stated, some years later, to a sub-secretion of the thyroid and partial myxedema.

The majority of patients with this disease, properly treated, will certainly recover, and the better understanding of the treatment and the curative value of early operation as now understood, will probably produce 75 per cent. of recoveries. If left alone, probably not more than a small percentage of patients die of the intensity of the disease itself, but most patients die from complications.

PROGNOSIS

It is impossible to estimate the probable duration of the disease in a given instance. If there is a family tendency to neuroses, or if the patient has shown symp-

toms long previously of neurotic temperament, the recovery will be slow. If the onset of the disease was rather rapid the recovery will probably be more rapid. The older the individual with exophthalmic goiter, generally, the sooner may recovery be expected. Younger patients who recover from the disease are likely to have recurrences. Most patients may be greatly improved even without operation; quite a percentage can be cured without operation; a certain percentage can never be cured without operation. The constantly better prognosis from operation when done early in the disease should cause physicians not to allow a prolonged tachycardia from Graves' thyroid disease to persist, as a heart muscle may become permanently damaged, and then the prognosis of an operation is serious. Also, great loss of weight should not be allowed before an operation is advised. The danger of permanent invalidism and diabetes should always be remembered and a patient should not be allowed to suffer with the disease for years without operative interference having been early suggested and urged.

TREATMENT

First, when the disease is not positively in evidence, but suspected, a small dose of thyroid, as above suggested, should be given daily for a few days or a week, not more than 0.20 gm. (3 grains) of the official thyroid powder once a day. If the symptoms are aggravated, the thyroid is hypersecreting and the patient is in danger of Graves' disease. The treatment at this time, after the diagnosis has been made, is not dissimilar (except that bed rest is not urged) from the treatment of the actual disease.

Meat, coffee, tea, and alcohol should be entirely cut out of the diet. Sexual excitement should not be allowed. Any uterine disturbance should be investigated and corrected, if possible. Some simple iron preparation should be administered, and the elixir of the glycerophosphates of lime and soda is indicated, especially as it has been shown that when there is exophthalmic goiter there is increased elimination of calcium in the urine, also, the lime salts seem to act as a sedative to the thyroid gland. If a patient is well-nourished and in good physical and blood condition the bromids may be given for a time, but should not be long continued, and generally are contra-indicated by the debility and weakness. Most patients, especially when meat is stopped, should receive a small dose of iron each day. On this treatment the majority of these patients will recover, although they may have relapses.

If the thyroid is distinctly enlarged and a few of the symptoms of Graves' disease are present, small doses of iodid may stimulate the gland to more normal activity so that it will not secrete abnormally. This may be tried when active symptoms of Graves' disease are not present. If they are present the iodid will generally make the symptoms worse, as does thyroid feeding.

If the disease is actually present and with all the classic symptoms, the most important symptom is the rapid heart action. Anything that will reduce a pulse of 130, 140 and even more to 100 or 110 is of benefit. Such a patient must be put to bed, and must stay there for the period necessary to quiet the heart. The diet should be that above outlined. Such laxatives as necessary should be given, and daily massage should be done. The glycerophosphates of lime and soda should be tried, and if these do not quiet the heart or the symptoms of hypersecretion, perhaps the best treatment is the hydrobromid of quinin, given in 0.30 gram (5 grain) doses, three times a day. It may at first cause a little cinchonism, but soon this is not noted, and it seems sometimes to have specific action on the thyroid, and much better action than the sulphate of quinin. Rarely in such severe cases should bromids be given, as they will add to the debility that is present and coming. Atropin in any form is generally of little value, and sometimes seems to excite the nervous system, if in doses sufficient to show its action. Suprarenal substance or extract is of no value. Thymus gland substance has often seemed to cause some improvement, and at other times has absolutely failed. Opium in any form (morphin, codein, or other alkaloid) will always diminish the thyroid secretion, but the future is bad, and such administration is rarely justifiable.

Digitalis is of no value in reducing the frequency of the heart beat when it is stimulated by thyroid secretion. The patient may be poisoned with digitalis and the heart not slowed at all. Strophanthus may be given if the heart is weak, but it will not slow it. Strychnin is generally contra-indicated on account of increasing the nervous irritability. The heart must be quieted with calcium preparations and mental and physical rest, which can best be obtained in a hospital or sanatorium.

Ergot (and it must be a good ergot, a sealed bottle of a pure fluid extract) in a dose of half a teaspoonful given in water, three times a day after meals, may be of benefit in quieting the heart and contracting the peripheral blood-vessels, and should be tried.

Any active electrical treatments of the thyroid, as faradization, galvanization, cataphoresis, or any local counterirritant action, or the rubbing in of ointments are almost invariably of no avail, and often do more harm than good. In fact, the less the gland is manipulated the better.

The application of the *x*-ray to a gland has been declared by some skilled operators to be of value. It has been tried frequently without success, however, and it is certainly inadvisable if a future operation is contemplated. It injures the skin, makes the skin adherent to the gland and tissues below, and may interfere with perfect healing. In other words, it does not present a good surgical field.

When the Roentgen ray treatment is successful, it has been noted that the gland diminishes in size, and therefore its secretion is probably diminished and the tachycardia is lessened.

The milk from thyroidectomized goats has been administered with good results; also various serum preparations prepared from animals that have been thyroidectomized have at times seemed to furnish an antidote to the hypersecretion of the thyroid, but such treatments, though logical, have not been attended with more than occasional success. An antithyroidin has been presented, which is prepared from the serum of thyroidectomized sheep, the dose of which is 4 grams, (1 drachm) three times a day. Also a thyroidectin has been put on the market, prepared from the same source, put up in capsules, the dose of which is one or two, three times a day. Any of these treatments should be continued for from four to eight weeks, and then repeated at intervals of two or three months.

Beebe and Rogers, of New York, have used successfully an antithyroid serum prepared by them from the serum of Belgian hares after they have injected the animals with serum obtained from exophthalmic goiter thyroids. The serum so prepared has seemed to act as an antitoxin. If the patient develops an immunity or does not any longer improve with the serum from this

animal, they use a serum prepared from some other animal. Injections are given every forty-eight hours. The shorter time the disease has been in existence, the greater the success of the treatment. Lately, Dr. S. P. Beebe, of New York, has stated his belief that extracts of human thyroids, carefully prepared and administered hypodermatically, are by far the best for the human subject. By careful analysis he has come to the conclusion that any portion of the prepared protein that contains about 0.0034 of iodin represents 1 gram of the active protein. He prepares tablets of different strengths representing 1, 2, and 5 per cent. He understands that a 1 per cent. tablet means that 1 per cent. of the dried weight of the tablet is made up of the purified thyroid protein. For hypodermic use he makes various strengths standardized on the iodin basis, put up in sealed glass tubes.

From the degenerations that take place in the thyroid glands of patients with Graves' disease, and from the disturbance that this disease causes in other parts of the body, and also taking into consideration the question of whether the gland disturbance is the primary cause of Graves' disease, the number of successes from such serum injections must be limited. Also, the difficulty of obtaining a sufficient amount of this serum, which must be prepared from the removed exophthalmic goiter glands, must allow but a small portion of patients with Graves' disease to be so treated.

Consequently, when any patient with exophthalmic goiter does not quickly improve with the medicinal treatment above suggested or with the antithyroid treatments that may be readily applied, resort should be had to surgery, and partial thyroidectomy is indicated. Such an operation is indicated if three or four months of medical treatment has not caused marked amelioration of the symptoms; if the exophthalmos is likely to injure the sight; if there is great loss of weight and strength; if the tachycardia persists; and if there is any serious pressure on the esophagus, trachea, or nerves. Such operations are successful in removing the symptoms of the disease. Contra-indications to operation are, as above stated, a weak heart muscle as shown by an irregular and wavering tension pulse; edemas that would show lack of cardiac compensation would also contra-indicate operation. Frequent attacks of diarrhea should postpone such an operation.

The substitute operation of ligating one or more of the enlarged thyroid vessels may ameliorate some of the symptoms, but such ligations are often only temporary in their benefit. The danger of pressing too much thyroid substance into the circulation during ligation is almost as great as during the operation for partial excision.

The prognosis is much better in early operation in Graves' disease than later, on account of the liability of the whole gland to become disturbed in its function, and the probability that other ductless glands are consequently disturbed in their functions, perhaps permanently. It seems to be a fact that different parts of the thyroid may be functioning differently although the complementary secretion may be nearly normal. Consequently, if it is possible to determine the portion of the gland that is especially diseased, it should be that portion which is removed. Sometimes the healthy portion of the gland has been removed and the diseased portion left, and death has occurred on this account. The removal of one lobe of the gland, the most diseased portion, with perhaps the isthmus is generally a sufficient operation. Of course as many parathyroid glands as possible should be left. It is rare, and then perhaps only when there is carcinomatous degeneration, that the whole thyroid should be removed. If it is necessary to remove the whole gland, and consequently perhaps most of the parathyroid glands, parathyroid substance or extract, or some calcium salt at least, should be administered for some time to prevent convulsive symptoms from such extirpation. Later, thyroid feeding would prevent myxedema.

Dr. C. H. Mayo, Rochester, Minn. (*Ohio State Med. Jour.*, October, 1907) believes that ether is the best anesthetic to use, and half an hour before the ether is begun gives a hypodermatic injection of 1/6 of a grain of morphin, and 1/120 of a grain of atropin. The morphin prevents the necessity of much ether, and the atropin prevents the profuse mucus secretion. He places the patient in the reverse Trendelenburg posture which tends by gravity to relieve the upper part of the body of blood. He leaves the posterior capsule of the gland undamaged and thus preserves the parathyroids. Of course the recurrent laryngeal nerve is looked for and protected. He washes the wounded area with Harrington's solution (alcohol 640 parts, water 300 parts, hydrochloric acid 60 parts, bichlorid of mercury 8 parts). This prevents lymphatic absorption. The patients after the operation are given large saline enemas. If they do not retain these, they are given saline solution subcutaneously. This treatment he repeats several times during the first thirty-six hours. If the patients sweat profusely he gives atropin. If they are very restless he gives morphin. Most patients are not confined to bed more than three days.

Dr. T. P. Dunhill (*Brit. Med. Jour.*, May 22, 1909) believes that local anesthesia governs the whole question as to the safety or danger of the operation from exophthalmic goiter. He does not believe that general anesthesia can be recommended as safe, while local anesthesia may be recommended as perfectly safe, unless the patient is moribund.

Drs. Max Ballin and J. W. Vaughan, of Detroit, (*Jour. Michigan Med. Society*, April, 1910) come to the following conclusions as to the final results of thyroidectomy in Graves' disease:

First: Early operation before secondary heart and eye changes have occurred practically assures a cure to the victim of exophthalmic goiter. They would not operate during the height of an exacerbation of the disease, but after absolute bed rest in which the patient's symptoms have quieted down, what might be termed an interval operation.

Second: In no case in which the symptoms have been present for a period of over five years and in which permanent heart changes and eye changes have occurred, can a positive recovery be promised, although the condition may be much improved. These are the dangerous cases for operation, and each must be studied and treated according to the symptoms.

The Medical Profession in Norway.—Recent statistics show that there are now 1,161 registered physicians in Norway and eighty-eight residing in foreign lands, sixty-four being in the United States. The average in all Norway is one physician to 2,007 inhabitants, but in Christiania there is one physician to 850 inhabitants. The age of 66.3 per cent. is between 30 and 50; only 5.3 per cent. are between 25 and 30, and only 3.1 per cent. over 70. Editorial comment on these figures in the *Norsk Magazin for Laegevidenskaben* calls attention to the small number of physicians surviving past 50 and the small proportion who are ready to practice before the age of 30.

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[For other information see second page following reading matter]

SATURDAY, DECEMBER 17, 1910

RECENT STUDIES ON TYPHUS FEVER

It will be recalled that Nicolle of Tunis, in Africa, recently succeeded in transmitting typhus fever to the macacus monkey, and that Anderson and Goldberger, working independently with the disease as it is found in Mexico City, were able to infect monkeys with blood taken from typhus patients. These results were further confirmed by the investigations of Ricketts and Wilder. Recently Gaviño and Girard[1] report the transmission of typhus to monkeys of an inferior species, namely, the *Ateles vellerosus*, indigenous to Mexico, by subcutaneous injections of blood from typhus patients. The animals, after an incubation period of eleven to fourteen days, succumb to prostration and a high fever. An exanthematic eruption, such as occurs almost constantly in man, is absent, but the thermal elevation and other symptoms are regarded as sufficiently characteristic to permit the diagnosis of typhus. Immunity is conferred by a single injection so that the monkeys after their recovery from the disease are unaffected by subsequent inoculations. Other animals, such as the white rat, white mouse, rabbit, dog, pig and horse all proved insusceptible to typhus fever.

The Mexican authors report also one experiment in which they seem to have obtained a protective vaccination by the inoculation of a monkey (*Ateles*) with heated blood from a patient in the twelfth day of a severe attack of typhus fever. Four c.c. of the defibrinated blood were sealed in a glass tube and heated for fifteen minutes at 55 C. The control animal received an equal amount of unheated blood, and after an incubation period of fourteen days passed through a characteristic and severe attack of typhus fever. The monkey which received the heated blood showed a slight rise of temperature during the three days after the injection, due, it is suggested, to toxins liberated by the destruction of microorganisms in the heating. An immunity test consisting of the injection of fresh typhus blood from a typhus patient was given and no febrile reaction or appreciable malaise resulted, although the control sickened fifteen days after his injection of the same blood and died five days later. Unfortunately the experiment as yet stands alone, the scarcity of monkeys interrupting the investigation. We hope that further experiments may be made, as they promise results of practical value in the working out of a successful vaccination against typhus fever.

Gaviño and Girard also studied the blood of typhus patients. No cultivable germ was discovered, but the forms recently described by Ricketts and Wilder were found in the plasma. These structures in smears stained with Giemsa solution appear in three forms: (1) as bipolar bacilliform bodies, two microns long and one-half micron wide, with rounded ends, the poles staining a violet purple and the interpolar substance not at all; (2) similar bacilliform bodies in which a pale violet-staining mass is seen in the central part between the poles; (3) bodies measuring one and one-half microns in length formed of two spherical granules separated by a space in length twice the diameter of the granules, one granule colored a reddish purple with Giemsa, the other blue.[2]

Gaviño and Girard are of the opinion that the bodies represent products of nuclear disintegration and karyolysis rather than microbes. They base their conclusion on the study of smears from the spleen of one of their diseased monkeys in which they claim to find granules which in some instances show clearly the origin from the nuclei of the leukocytes and in others simulate closely the bodies seen in the blood plasma.

Since 1883, when Mott described diplococci in the blood of typhus patients, numerous microorganisms have been put forward as the specific cause of typhus. Among the more important of these are, a strepto-bacillus obtained by Hlava in 1888 on various culture media, a diplococcus described by Dubief and Bruehl, and a piroplasma seen in the blood by Gottschlich in Alexandria. All, with the exception of the last, were cultivated, but as these observations have not been confirmed, the consensus of scientific opinion seems to be that the problem of the causal agent of typhus still remains unsolved. The bodies described by Ricketts and Wilder cannot be cultivated. Their bipolar structure reminds one of the plague bacillus and this is of interest in view of the similarities between typhus fever and plague: both diseases are acute, self-limited, blood infections; both are associated with subcutaneous hemorrhages; both are apparently insect-borne. It has been shown that plague is carried from host to host by the flea and recent investigations point strongly to the louse as the transmitter of typhus fever. These and other theoretical reasons entitle the bodies in question to very careful consideration, and the results of further investigations are awaited with interest.

1. Gaviño and Girard: Pub. d. Inst. Bact. Nacional, Mexico, 1910.

2. I. Prieto describes other phases of the research in the Cronica Medica Mexicana, 1910, xiii, 314.

DIABETES

The important and practical group of communications on the subject of diabetes by Lusk, McLeod, Woodyatt, Pratt and Wallace, which appears in this issue, is worthy of special attention. The papers represent the principal lines along which the work on diabetes is being advanced. The surveys of the literature will be found to be critical, and the commentary to be based on new data which represent definite progress worthy of attention.

Lusk calls attention to the fact that in cases of the severest forms of diabetes mellitus or phlorhizin diabetes in which the glycogen deposits in the body have become exhausted, the sugar in the urine comes solely from protein, provided no starch or sugar is ingested. Under these circumstances the total urinary sugar comes to bear to the total urinary nitrogen a constant ratio, viz., 3.65 grams sugar to 1 gram nitrogen. This means that about 60 per cent. by weight, *i. e.*, the possible maximum, of the protein metabolized has been converted into sugar, all of which is then excreted. In another place Lusk has called this a "fatal ratio," as it indicates a complete loss of tolerance for sugar and a hopeless prognosis. Such a method of making a forecast is significant of what one day will be the rule in medicine. In attaching significance to such a ratio it is, of course, understood that the ratio must be found steadily on successive days, for in cases of no great severity a transient accidental ratio of about 3.65 to 1 may be encountered during a period in which a heavy discharge of sugar from liver glycogen is taking place into the blood. "The intensity of diabetes," says Lusk, "should not be determined by the percentage of sugar in the urine, but by the relationship between the ingo of sugar (or starch) plus the possible maximum of sugar production from protein, as compared with the total output of sugar," a relationship which when expressed in the form of an equation, as done by Falta, gives his "coefficient of excretion." By means of Falta's coefficient a total absence of sugar tolerance is designated as 100. Milder deficiencies of tolerance may be expressed by any whole number or fraction between 0 and 100, thus doing for diabetes what the sphygmomanometer does for arterial pressure, or the erythrocyte count and hemoglobin estimate do for the gauging of an anemia. This employment of figures for expressing the severity of a diabetes will result in a sharper definition or the gradual discarding of such terms as "mild," "moderately severe," "severe," etc., which are now so much employed and with different meanings in different localities. And yet there are those who still, in referring to diabetes, talk about "a 2 per cent. urine," and in other conditions, notably in pregnancy and Bright's disease, draw conclusions from the percentage of urea, with no regard for the total quantities excreted. There are others, too, who do indeed estimate the total quantity of sugar or of urea, especially the latter, and even of nitrogen and other substances, and then draw conclusions innocent of all knowledge concerning the total amount of protein and non-nitrogenous food which the individual has eaten and by which the amounts of the substances found in the urine are so markedly influenced. By feeding experiments in which he has employed certain simple components of the protein molecule, Lusk is in a position to state that the ability of protein to pass over into sugar is inherent in certain of the component amino-acids and is not due to preformed sugar in the protein molecule.

Woodyatt, working with certain simple sugars, some of which may be regarded as the components of the glucose molecule, brings experimental evidence to show that in the course of the utilization of sugar in the body a cleavage of glucose into two molecules of triose is an important event. He also shows a suggestive parallelism between certain oxidations of sugars which can be performed in the laboratory and those oxidations of sugar in the body which have to do with the checking of acidosis—the chemistry of the latter process receiving therein its first specific consideration.

In keeping with a modern tendency to reexamine some of the teachings concerning diabetes which have been regarded as fixed, McLeod's detailed study of the mechanism of the form of diabetes produced by irritation of certain parts of the nervous system is able and highly suggestive. In Claude Bernard's puncture of the floor of the fourth ventricle McLeod sees a stimulation at the center of a reflex arc, the efferent limb of which runs in the splanchnics and whose effect is to lessen the power of the liver cell to hold its glycogen, *i. e.*, to lessen the inhibition which normally keeps glycogenolysis (or the conversion of glycogen into sugar by the action of glycogenase) within its normal limits. He believes that the asphyxia glycosurias and certain of those caused by organ extracts are ultimately of the same mechanism as the form caused by splanchnic stimulation. Epinephrin glycosuria he is inclined to regard as part and parcel of the well-known action of epinephrin on the sympathetic autonomic nervous system. So in the case of thyroid glycosuria and other experimental forms McLeod registers a protest against a too general tendency to interpret the effect in terms of pancreas inhibition. Even in diabetes mellitus he suggests that a deranged glycogenic function of the liver may contribute to the picture in some degree. In this connection it is interesting to note that Wallace in dogs made diabetic by total pancreas extirpation—a condition which soon clears the liver of glycogen—sees no effect from the use of atropin, whereas Rudisch and some others find by its use an amelioration of glycosuria in diabetes mellitus. Fluctuations in glycosuria caused by such drugs as atropin and opium are greatest in cases in which the liver still holds glycogen.

Pratt's work on the sugar tolerance of dogs before and after ligation of the pancreatic ducts leads him to believe that ligation of the ducts, if thoroughly done,

will result in some loss of tolerance for sugar, if not in real diabetes, contrary to a general belief. After such ligations he fails in some instances to find in the atrophic pancreas rest any Langerhans tissue, but only connective tissue and remnants of acinus cells and duct epithelium. He concludes, from this and other considerations, that the production of an antidiabetic principle is not confined to island tissue. The problem is technically beset with many difficulties. Wallace reiterates what so many have found to be true and what is nevertheless so doggedly disregarded by hundreds of physicians, that save in certain special situations or emergencies there is no drug that is effectively employed in the treatment of diabetes mellitus.

THE SOCIAL AND LEGAL VALUE OF VITAL STATISTICS

Physicians, individually and as a class, have long realized the value of trustworthy vital statistics as a basis of knowledge regarding diseases. Owing to their efforts in urging the passage of vital registration laws, the general public, members of legislatures and even physicians themselves, have largely lost sight of the non-medical value of vital statistics. The passage of such laws has come to be regarded as a favor to physicians and as a matter in which the general public has little, if any, concern. Yet the recording of births and marriages is of no advantage to physicians as such; they are interested in vital statistics only as these contribute to sociologic knowledge. The registration of deaths is useful to the medical profession only in affording information regarding the frequency and mortality of disease. Hence the interest of the medical profession in vital statistics legislation is, at most, entirely impersonal and altruistic.

The subject, however, should be of the greatest interest to all citizens, because it is important that every individual should be able, if necessary, to produce legal evidence of his birth and parentage. It is important that records should be made of the time, place, manner and cause of death of every human being. Registration of vital facts is of the greatest value in determining questions involving parentage, legitimacy, inheritance, property rights, marriage and divorce—in fact, in most of the social or business relations of life. The value of proper registration of these essential facts has long been recognized by all civilized nations except our own. The utter neglect of vital registration by many of our states is a constant source of astonishment to visitors from other countries. In this connection, an article by Deacon,[1] the statistician of the Kansas State Board of Health, is worthy of comment. Our neglect of such fundamental and truly vital matters can be accounted for only by the comparative newness of our social organization. Each state, as it becomes older, and as social relations become more complicated, will find it necessary to provide some effective means for registering essential facts regarding its citizens. It is particularly strange that, in the southern states, where the possibility of racial admixture is greatest, and where even a suspicion of tainted ancestry carries with it the gravest social consequences, there has been little effort to make or to preserve legal records of birth. The reason for this neglect must surely be that the legal and social importance of vital statistics registration has never been properly brought to the attention of the public leaders in the South, for certainly when it is appreciated, these states will not delay the adoption and enforcement of appropriate laws on this subject. It is not conducive to national pride to know that such countries as New South Wales, Tasmania, New Zealand, Ceylon, Jamaica, Finland, Roumania, Bulgaria, Japan and Chili are far ahead of the United States in the proper registration and preservation of records on vital matters. Still less gratifying to our self-satisfaction is Mr. Deacon's statement that the United States in this particular must be classed with Africa and Borneo.

1. Deacon, W. J. B.: Vital Statistics in Relation to Public Welfare, Jour. Kansas Med. Soc., November, 1910; abstr. in this issue of THE JOURNAL, p. 2172.

THE PREVENTION OF INFANT MORTALITY

The deliberations of the American Association for the Study and Prevention of Infant Mortality, the first annual session of which was recently held, culminated in a series of five resolutions, which, though different in subject, are all in harmony with the aims of the association.

The first of these resolutions deals with the establishment of a national department of health, and shows a broad conception of the essentials of the movement for the prevention of infant mortality. Concerning this particular resolution, a report of the meeting[1] says that Prof. Irving Fisher described the sinister commercial influences that are hypocritically hampering the establishment of a national health department under the pretense of safeguarding "medical freedom," and showed how such a branch of the federal government might become a supremely efficient instrument in the promotion of all those matters of public hygiene and legal enactment on which the reduction of infant mortality depends. The association went on record as "endorsing the movement for a national department of health, in the belief that the establishment of such a department will lead to great reduction in infant mortality, not only through improved regulation of interstate commerce in milk, infant foods, and medicines; but also through wider dissemination of information on the causes of infant mortality and their prevention."

1. Brubre, R. W.: Saving the Babies, Survey, Nov. 26, 1910, p. 317. A report of the meeting is now running in THE JOURNAL, in the Department of Society Proceedings.

The report of the committee on birth registration, by Dr. Cressy L. Wilbur of the Bureau of the Census, inspired a resolution endorsing the model law of the American Medical Association for the registration of births and deaths. This precipitated, incidentally, an interesting discussion, led by Dr. W. H. Welch, on the midwife question, which resulted in the appointment of a committee to formulate a definite policy on this subject.

The third resolution urged on the Secretary of Agriculture the establishment of official standards for milk "branded as certified, inspected or pasteurized" and the enforcement of such standards in interstate commerce.

The remaining resolutions related to instruction of pupils and teachers in elementary hygiene, sanitation and biology in the public and normal schools and in colleges, and the need of safeguarding mothers from industrial and economic pressure and of instructing them in the principles of healthy parenthood and infant hygiene.

This is an ambitious program, but it touches the vital points in the prevention of infant mortality.

Current Comment

READY-MADE MIXTURES

There is little doubt that the tendency in some quarters to underestimate the value of drugs in the treatment of disease is due to the unscientific way in which drugs have been used rather than to the lack of efficacy of the drugs themselves. No reliable conclusions can be deduced regarding the use of drugs unless the administrators of such drugs know the exact amounts that have been used; in other words, accuracy of dosage is essential to scientific therapeutics. In the Pharmacology Department of this issue, one of the reasons for unscientific prescribing is made clear. There are on the market tablets containing bismuth, opium and phenol in varying (alleged) proportions. Whether these tablets were originally made by the various manufacturing pharmaceutical houses in response to a demand by physicians or, as is more likely, were put out by an enterprising firm to catch the physician's fancy makes little difference. The point is, such tablets are on the market, made by a number of large and reputable concerns, and the supposition is that the tablets are prescribed where definite amounts of bismuth, opium and phenol are indicated. Yet careful investigation extending over two years, made in the Association laboratory, proves beyond question that so far as the phenol-content of these tablets is concerned, the dosage is absolutely unreliable. Whether this unreliability is due to the technical difficulties of making such tablets, to the lack of care, or even to actual dishonesty on the part of the manufacturers, may be open to discussion, but it is indisputable that such tablets cannot be scientifically prescribed. Not only should physicians cease prescribing such products, but self-respecting pharmaceutical houses should cease manufacturing them or else should acknowledge openly that the formula on the label does not represent the actual composition of the product.

ENDOWMENTS FOR MEDICAL EDUCATION

A few years ago President Eliot aptly stated that "the way to get endowment for medicine was to improve medical education." So the best policy for medical colleges to pursue is not to wait, Micawber-like, for something to turn up, but to find out what they need and then to go after it. In some instances this may require, before starting the campaign for ample financial support, an energetic house-cleaning and the making of mergers or other changes so that the college will deserve endowment. That this is a wise policy has been repeatedly shown. The faculty of Drake University College of Medicine voted to close the school unless money enough was forthcoming to conduct the college in accordance with modern standards. As a result $150,000 was raised in a few weeks' time. In Colorado there were two medical colleges, one of which, being in a small city, lacked ample clinical facilities and the other, owing to insufficient finances, lacked ample laboratory equipment. It was decided to merge the two schools so that the strong points of one could be made to supplement those of the other. This was done with the result that one strong college remained in Colorado with a unified medical profession back of it. A later instance is at Western Reserve University, Cleveland. Last June the trustees determined to raise a million dollars to endow the medical department, and then set about to get it. It is now reported that nearly $700,000 has been raised. There are numerous localities where such successes may be duplicated if the right steps are taken. The local college or colleges, however, must take the initiative and make all the improvements possible before seeking help elsewhere. The college should first show itself capable of the proper use of funds entrusted to it and then the funds will be forthcoming.

NEW VIEWS ON WOUND-HEALING

While the more ambitious dreams of the surgeons of the pre-Listerian era in regard to wound-healing have been fulfilled, according to Carrel's article in this issue, we have no right to believe that the treatment of wounds has reached its ultimate perfection. We content ourselves as yet with securing a degree of asepsis, and leave to Nature the healing of the wound and the care of cicatrization. Carrel believes that we may be able to go farther than this and to activate the processes of repair, so that wounds which, under our best present methods, heal in a few days, may heal in a few hours; that the development of methods for the stimulation of the growth of epithelial cells, for the inhibition or activation of connective-tissue proliferation and the artificial production of osteogenesis would greatly improve the therapeutics of ulcerations of the skin, and of lesions of the peripheral nerves, the bones and many other tissues. With a view to the development of this new prin-

ciple of surgery, Carrel has undertaken some animal experimental studies to ascertain the laws of the redintegration of tissues. It is a custom of florists to use chemicals for the activation or "forcing" of the growth and maturation of flowers, aside from the use of the ordinary fertilizers, heat, etc. Analogous processes may be invoked in the growth and repair of tissues. Carrel's first article concerns regeneration and cicatrization of surface wounds, and he deduces from his studies certain preliminary principles which are of interest, and which indicate results of the highest importance in wound-healing.

TYPHOID FEVER AND BUSINESS

Sometimes the connection between excessive typhoid fever and the commercial welfare of a town stands out so clearly that the most reluctant observer must grant its existence. This seems to be the case in Rutland, Vermont, where typhoid epidemics in 1909 and 1910 have been attributed to the water-supply. Financial retribution has followed at once. The managers of conventions scheduled to meet in Rutland have changed their intentions and the conventions have met in other places; a wealthy New Yorker who had purchased land and planned a costly residence in Rutland writes to the local paper that he cannot carry out his plan unless protection of the water-supply is assured; there is now talk of damage suits against the city by typhoid victims. Altogether the financial aspect of a polluted water-supply has become very prominent. The Rutland *News* is driven to remark that "there is no question that Rutland has suffered grievously in a business way during the past two years as a result of these annual visitations of typhoid. It is simply good common business sense that the source of the epidemic be eliminated. Commercial prudence, if nothing more, requires it." The experience of Rutland may serve to remind city officials, who deny the existence of danger from a sewage-polluted water-supply on the ground that other sources of typhoid fever exist in the community, that water-borne typhoid may be slow in appearing, but that it is likely when it does occur to bring more discredit and financial loss to a city than typhoid from any other source.

Medical News

ARKANSAS

Library for Sanatorium.—The people of Little Rock have made a liberal response to the appeal for the establishment of a library at the Arkansas Tuberculosis Sanatorium, Booneville. More than 100 volumes were donated on the first day of the appeal, and it is intended that a permanent library shall be established. It is also suggested that magazine subscriptions be donated.

Personal.—Dr. Harry C. Stinson, Little Rock, superintendent of the State Hospital for Nervous Diseases, has notified the Board of Trustees of State Charitable Institutions that he would not accept reelection for another term and asked to be released from duty at the expiration of his present term of office.——Dr. Sterling B. Gammill, Branch, fell from his buggy, November 29, fracturing three ribs.——Dr. L. O. Hunter, Branch, has moved to Chismville.

ILLINOIS

Physicians' Club Election.—At the meeting of the Physicians' Club of Monmouth, December 2, Dr. Chauncy Sherrick was elected president, and Dr. Joseph R. Ebersole, secretary.

Personal.—Dr. and Mrs. William A. Haskell, Alton, have gone to Bermuda for the winter.——Dr. James H. Walker, Effingham, having passed the required examination, has been commissioned captain and assistant surgeon and assigned to the Fourth Infantry.

Verdict Against Surgeon.—In the third trial of the case of Mrs. Carrie Smith against Dr. Ernest B. Mammen, Bloomington, in which damages were claimed on account of the alleged leaving of a sponge in the abdominal cavity after a surgical operation, a jury in the circuit court is said to have brought in a verdict for the plaintiff, assessing damages of $1,500.

State Board Prosecutions.—S. Hirschfeld, a graduate of the National Medical University, charged with practicing medicine without a license, is said to have been found guilty and fined $200.——In the case of Susannah Dyba, charged with practicing without a license, and said to be an old offender, the defendant is said to have been fined $200 and costs.——In the case of J. A. Nowlin, an osteopath charged with the administration of medicine and also with the practice of surgery, the case was dismissed on account of lack of evidence. The license of osteopaths in Illinois licenses to treat human ailments without using medicine and drugs or the performance of surgical operation.——In the suit brought by the State Board of Health against J. B. Albright, Kewanee, a licensed osteopath, for a similar offense, the defendant is said to have offered to pay a fine of $100 and engage no more in the practice as a physician, but does not wish judgment in court brought against him. The board declined to accept this proposition.——W. J. Bourque, an optician of Chicago, charged with practicing medicine without a license, is said to have been convicted by a jury in the municipal court of Chicago, December 6, and fined $100 and costs.——Madam M. L. LaMounte, a fortune teller of Chicago, charged with practicing medicine without a license, was found guilty and fined $100 and costs, and paid the fine.——Harrouton Shekerjian, Chicago, charged with practicing medicine without a license, is said to have been found guilty and fined $100 and costs. The fine was paid.——In the suit brought by the board against H. F. Fairfax, Chicago, for practicing medicine without a license, the defendant is said to have been found guilty and fined $100 and costs.

Chicago

Personal.—Dr. William A. Mann, who has been seriously ill with pneumonia, is reported to be convalescent.——Dr. E. L. Cornell, intern in Cook County Hospital, has recovered from an attack of diphtheria.——Dr. William E. Morgan, who was operated on for appendicitis recently, has returned home recovered.

Urge Retention of County Physician.—The new president of the Cook County Board has received letters from many prominent physicians of the city recommending that Dr. Haim I. Davis be retained as county physician on account of the record which he has made in that office, and expressing the hope that political reasons will not cause Dr. Davis' removal.

INDIANA

Personal.—Dr. Louis Severin, Bluffton, health officer of Wells County, has resigned to take effect Jan. 1, 1911.——Dr. Charles W. Shill, Lafayette, has been appointed physician for the Tippecanoe County jail and infirmary.

Superintendent Wanted.—The Board of Trustees of the Indiana State Tuberculosis Hospital, Rockville, is now receiving applications for the position of superintendent of the institution, who will be employed as soon as appropriation is made for maintenance. All applications and recommendations should be addressed to Dr. Henry Moore, president of the board of trustees, Room 25, State House, Indianapolis.

Built Within Appropriation.—The tuberculosis hospital commission, which had in charge the construction of the State Hospital, Rockville, at its meeting, November 30, reported that the hospital was constructed and finished ready for occupancy, with about $100 of the appropriation of $130,000 left to revert to the state treasury. The committee also reported more than $1,000 turned into the state treasury from earnings from the hospital farm during the construction of the building.

Club Interested in Pure Food.—The Board of Directors of the Commercial Club of Indianapolis, has signed a petition favoring the enactment of a federal law regulating the manufacture and sale of food containers and food put up in food

containers, compelling the marking of the containers so as to show the net capacity and net quantity contained and providing penalty for violation of these provisions. The club is also endeavoring to interest capitalists of the city in building sanitary tenement houses for the poorer classes of foreigners.

State Health Board Recommendations.—The State Board of Health, at its meeting, November 26, decided to make the following recommendations to the General Assembly: medical inspection of all public schools; approval of the board to plans and specifications of all public buildings before contracts are let; additional legislation to further restrict the pollution of streams, giving the board greater power in the prevention of such pollution; greater power to the board for the prevention of the pollution of sources of water-supply of the state, and greater power to the board in governing the construction of sewers.

IOWA

Ill in Hospital.—Dr. Emma J. Neal, Cedar Rapids, is reported to be ill with typhoid fever at Mercy Hospital, Cedar Rapids. ——Dr. Irving C. Wood, Logan, is ill in the Clarkson Hospital, Omaha.

Small-Pox in Border Town.—The alleged failure of the town officers of Bradyville, Page County, to enforce the state quarantine law in face of an epidemic of small-pox, has caused action to be brought by both the Missouri and Iowa state boards of health as Bradyville is just across the Iowa line from Missouri. The mayor states that there have been fifty cases of small-pox in the town, and that at present there are twenty-two cases in eighteen families.

Southeastern Iowa Physicians Meet.—The thirty-fifth annual meeting of the Southeastern Medical Society was held in Fort Madison, November 17, and the following officers were elected: president, Dr. Clyde A. Boice, Washington; vice-presidents, Drs. Frank C. Roberts, Fort Madison, and Smith A. Spilman, Ottumwa; secretary-treasurer, Dr. Edward F. La Force, Burlington, and censors, Drs. John F. Herrick, Ottumwa; Henry A. Leipziger, Burlington, and Frank R. Mehler, New London. It was decided to hold the next meeting in Washington.

MARYLAND

Personal.—Dr. Earle H. Sneavely, assistant physician at the Springfield State Hospital for the Insane, has been appointed third assistant physician at the Essex County Hospital, Overbrook, N. J.——Dr. Thomas B. McDonald, Cumberland, has been appointed physician of Allegany County.

Typhoid Fever in Troop A.—Dr. Alexius W. McGlannan, Baltimore, chief surgeon, Maryland National Guard, has reported on the cause of the epidemic of typhoid fever in Troop A of the organized militia of Maryland, following the encampment at Gettysburg last summer, which affected the health of eleven and caused one death. He thinks the extension of the disease was probably due to the custom in the troop of using a loving-cup and to an infected milk-supply. He recommends in future, preliminary examination of men, prohibition of fresh milk in camps, and that men submit to antityphoid vaccination.

Baltimore

Conference on Hygiene.—A conference on hygiene, with an exhibit, is to be held in Baltimore about February 1, under the auspices of the Medical and Chirurgical Faculty of Maryland. Dr. Marshall L. Price, secretary of the State Board of Health, will be in charge of the exhibit.

Personal.—Mr. J. Bosley Thomas has been made chemist and bacteriologist of the water department.——Dr. Frederick C. Blanck has been appointed chemist of the city chemical laboratory.——Dr. H. E. Kelsey has been elected vice-president of the North Carolina Society of Maryland.

Local Society Election.—At the annual meeting of the Baltimore City Medical Society, December 6, the following officers were elected: president, Dr. Arthur M. Shipley; vice-president, Dr. Ridgeley B. Warfield; secretary, Dr. William E. Magruder; treasurer, Dr. William S. Gardner; censor, Dr. Charles W. Larned, and delegates to the Medical and Chirurgical Faculty of Maryland, Drs. Richard H. Follis, Archibald C. Harrison, Standish McCleary, William A. Fisher and James M. H. Rowland.

MASSACHUSETTS

Unlicensed Practitioner Fined.—Jeremiah Scopa, East Boston, is said to have been found guilty, November 15, of practicing medicine without a license and to have been fined $100.

Many Medical Alumni.—According to the new directory of Harvard University, recently issued, Harvard now has 3,337 graduates in medicine. This does not include the graduates in dentistry.

Society Election.—At the annual banquet and election of officers of the Somerville Medical Society, held December 1, Dr. Frank L. Morse was elected president; Dr. Robert F. Gilson, vice-president, and Dr. Frederick N. Stephens, secretary-treasurer.

Physician Pardoned.—Dr. Ovid M. Paulhaus, Haverhill, sentenced to state's prison five years ago for having performed a criminal operation which resulted in the death of a Haverhill woman, was released November 25, after having served five years of his six and one-half years' imprisonment.

NEBRASKA

Gubernatorial Appointments.—Governor-elect Aldrich has made the following appointments: Lincoln Hospital for the Insane—superintendent, Dr. John T. Hay, Lincoln (third appointment); physician, Dr. Benjamin F. Williams, Tamora; pathologist, Dr. Lawrence B. Pilsbury, Lincoln; Hastings Asylum—superintendent, Dr. William B. Kern, Grand Island; Norfolk Asylum—superintendent, Dr. Andrew Johnson, Omaha; and penitentiary—physician, Dr. L. R. Jones, Amherst.

Society Elections.—Saline County Medical Society held its annual meeting in Crete, December 8, and elected the following officers: president, Dr. Howard W. Quirk, Crete; vice-president, Dr. Henry Hein, Wilber; secretary-treasurer, Dr. Porter F. Dodson, Wilber; and delegates to the state medical society, Drs. Francis J. Stejskal, Crete, and William S. Warder, Friend.——Lancaster County Medical Society, at its annual meeting in Lincoln, December 3, elected the following officers: Dr. John M. Mayhew, president; Dr. Warwick M. Cowgill, vice-president; Dr. Roy B. Adams, secretary-treasurer; Dr. Eduard W. Rowe, censor; and Drs. J. Stanley Welch and Henry J. Lenhoff, delegates to the state medical association, all of Lincoln. Dr. Francis F. Tucker, formerly of Lincoln, for many years a medical missionary in China, addressed the meeting on "Native Practice in China."

NEW YORK

Mayor Vetoes Action of Council.—Mayor Fuhrman of Buffalo has vetoed the recommendations passed by both houses of the city council, which were to the effect that the joint committee, which is investigating the necessity of building a general city hospital with a pavilion for communicable diseases, should visit other cities where such hospitals exist.

The Day Camp.—The Buffalo Day Camp for Tuberculosis has now been open for three seasons, 108 days in 1908; 141 in 1909; and 157 days in 1910. During this season there was an average daily attendance of 43, and 15,000 meals were served, exclusive of the morning and afternoon lunches. Germany, Poland and Italy were the nations most largely represented at the camp.

Low Death Rate.—The monthly bulletin of the State Department of Health for October, reports 10,942 deaths, equivalent to an annual mortality of 14.5 per 1,000. In October, 1909, the rate was 15.5, and in September, 1910, 15.4. About 21 per cent. of the deaths occurred during the first year of life. There was an increase in the number of deaths from cancer and a decrease in epidemic diseases, pulmonary tuberculosis, diseases of the nervous system, diseases of the circulatory system, pneumonia, and bronchitis.

Personal.—Dr. George A. Newton, Freeport, has succeeded Dr. Edwin Carman as health commissioner.——Dr. William B. May, milk inspector of the Department of Health of Buffalo, has been appointed chief of the State Department of Health, vice Dr. William A. Howe, made deputy commissioner of health of Buffalo.——Dr. Eugene A. Smith has returned to Buffalo and resumed practice.——Dr. Thomas H. McKee, Buffalo, has returned from abroad.——Dr. Alva Le R. Chapin, Niagara Falls, was seriously injured in a collision recently when his automobile was struck by an Erie freight train and demolished.

New York City

Gift to German Hospital and Dispensary.—The trustees of this institution have formally accepted the gift of Mrs. Anna Woerishoffer of $100,000 to be used to found a children's ward to be known as the Dr. Abraham Jacobi Ward.

Epidemic in East New York.—The outbreak of diphtheria and scarlet fever in East New York which was first noted about two weeks ago has assumed epidemic proportions. There are at present about 200 children under surveillance of the inspectors. The scarlet fever is of a mild type.

New York Subscribes Half a Million.—On the eve of the annual meeting of the Red Cross Society it is announced that New York city has completed its apportioned sum, based on ten cents per capita population, for the $2,000,000 endowment fund of the society. New York was the first city to complete its quota.

Another Open Air Classroom.—The architects for the city have filed plans for an open air room and diet kitchen on the roof of the two-story public baths and gymnasium on the north side of Carmine street which will cost $6,000. The room will accommodate as an open air classroom fifty children inclined to tuberculosis.

Dinner to Dr. Weir.—A dinner was given at the University Club, in New York, December 10, in recognition of the half-century of service to the profession by Dr. Robert F. Weir. About a hundred were present, including a large proportion of men who had served as house surgeons under Dr. Weir. Among the speakers were Drs. Maurice H. Richardson, Boston; William L. Rodman, Philadelphia, and William S. Halsted, Baltimore. The proceedings included the presentation of a silver cup to Dr. Weir.

PENNSYLVANIA

State Tuberculosis Exhibit to Go to Wales.—The Pennsylvania Society for the Prevention of Tuberculosis received a request from Wales, December 3, for the loan of its educational exhibit, to be shown in a campaign against tuberculosis now being organized in that country. The request comes from Thomas Jones, secretary of the Welsh National Memorial to King Edward the Seventh, accompanied by the statement that of all the exhibits at the International Congress of Tuberculosis, held in Washington, 1908, that of the Pennsylvania Society was considered the best.

Health Conference.—The Western Pennsylvania Public Health Conference, organized at the instance, and under the auspices of the Central Council of the Associated Charities, was held in Pittsburg, November 29 and 30 and December 1. The opening session was addressed by Dr. Sidney E. Goldstein on "Hospitals and Health Agencies of the Pittsburg District and Their Specific Problems and Needs." The next session was devoted to the general subject of "Dispensaries, Their Places and Function, Methods of Cooperation Among Them, Their Opportunities and Responsibilities for Affecting the Home Conditions and Home Care of Patients;" the opening address being delivered by Dr. Richard C. Cabot, Boston. Remarks were also made by representatives of eighteen dispensaries of Pittsburg, presenting features of their work and suggestions in line with the theme of the meeting. At the first evening session, the general subject was "Restoration and Prevention, How the Curative and Preventive Work of Hospitals and Other Health Agencies may be Promoted and Developed by Developing Social Service and the Human Interest Point of View, Side by Side with Scientific Professional Skill and Material Equipment." Dr. Richard C. Cabot, Boston, delivered an address at this session on "Social Service in Hospitals and Dispensaries," and Dr. Samuel G. Dixon, Commissioner of the Pennsylvania Department of Health, delivered an address illustrated by stereopticon views on "How Pennsylvania Fights Tuberculosis by Improving the Homes, Occupations and Habits of the Tubercular." Nursing was the general topic of the morning session on Wednesday with the theme "How Should Nurses be Enlisted, Selected, Trained and Directed for Competent Service in Hospitals, Dispensaries and Private Families." "What are the Essentials for Visiting Nursing Service to the Poor in Their Homes?" The principal address was by Miss Adelaide Nutting, Johns Hopkins University. Dr. Henry M. Hurd, superintendent of Johns Hopkins Hospital, opened the discussion on hospital cooperation by an address on "To What Extent is it Desirable and Practicable to Develop Means and Habits of Cooperation Among the Hospitals in the Purchase of Supplies, Relations with Employees, Admission of Charity Cases, Publication of Needs Encountered and Work Accomplished in the Holding of Conferences as to Common Problems and in Any Other Appropriate Ways," followed by five-minute remarks from representatives of thirty-five hospitals. Efficiency and finance was the general topic for the evening session, the theme being "By What Standard or Test Should the Work of Hospitals, Dispensaries and Nursing Agencies be Measured?" and "To What Extent and Under What Supervision Should Financial Support be Provided Through Public Funds?" with an address by William H. Allen. The discussion was taken up under the general heads of instruction, subsidies and support. At the morning session of the third day, "Children's Health Agencies" were considered, and in the afternoon the general subject was "Investigation and After-Care of Charity Cases." Dr. Charles P. Emerson, Superintendent of Clifton Springs Sanitarium, delivered an address on "Should Applicants for Free Treatment or Charity Rates be Investigated Before or Upon Admission, and Followed up with Friendly Service After Dismissal?" The discussion was taken up under the general heads of self-help, investigation, after-care, practicability and cost. The afternoon session was devoted to a young men's rally, when the subject "The Young Men's Health Problems, Including Sex Hygiene," was discussed. At the closing session of the conference "Community Education" was considered under the general theme "How May Sickness be Prevented and Good Health Promoted by Improving the Homes and Habits of the People Through Popular Education." The principal address, on "Educating the City," was delivered by Dr. William A. Evans, health commissioner of Chicago.

Philadelphia

Parrish Portrait for College.—At a meeting of the College of Physicians, held December 7, a portrait of Dr. Joseph Parrish was presented by Dr. James Tyson on behalf of the donor, Mrs. Susan Parrish Wharton. Dr. Parrish was born Sept. 2, 1779, was elected a member of the college in 1810 and died Mar. 11, 1840.

Consumptives' Open-Air School.—Preparations are being made for the establishment of an open-air school for the instruction of boys and girls suffering with incipient tuberculosis, which will be under the joint care of the Board of Education and the Department of Public Health and Charities. The school will accommodate more than 100 pupils and classes will be heard out-of-doors during the whole school term.

Personal.—Dr. Louis P. Posey has been appointed a member of the State Board of Medical Examiners, vice Dr. Caleb S. Middleton, resigned.——Dr. Edward Martin has been made Barton professor of surgery in the University of Pennsylvania vice Dr. J. William White, resigned. Dr. Martin and Dr. Charles H. Frazier have been nominated to the board of trustees by the medical committee of the board.——Dr. John G. Clark gave a dinner, December 6, in honor of Dr. Franklin H. Martin, Chicago. Plans were arranged for a clinical meeting of the Physicians of North America in this city in November, 1911, one similar to that held recently in Chicago.——Dr. Matthew H. Cryer, professor of oral surgery in the Dental School of the University of Pennsylvania, has been made editor of the *Imperial Stereoscopic Anatomy of the Head and Neck*, a magazine published by D. D. J. Cunningham and Dr. David Waterson, of the University of Edinburgh, Scotland. ——The directors of the poor of Chester County have chosen Dr. Ralph C. Kell, Philadelphia, as superintendent of the Chester County Hospital for the Insane.

GENERAL NEWS

Academy Mid-Year Meeting.—The fourth annual mid-year meeting of the American Academy of Medicine was held in Buffalo, December 1, under the presidency of Dr. Charles S. Sheldon, Madison, Wis. The conference dealt with the sociologic influences of hospitals and dispensaries.

Personal.—Dr. Wilfred T. Grenfell of Labrador, has been visiting in Charleston, S. C., on his way to the north from Florida.——Dr. Hamilton P. Jones, New Orleans, food commissioner of Louisiana, has been elected second vice-president of the Association of State and National Food and Dairy Departments.——Dr. Robinett B. Hayes, Fayetteville, N. C., has been elected grand regent of the Kappa Psi Fraternity.

Journals Consolidate.—The *Southern Medical Journal* has consolidated with the *Gulf States Journal of Medicine and Surgery*. The editorial office will be Suite 905 Van Antwerp Building, Mobile. The editor-in-chief is Dr. Seale Harris, and the managing editor, Dr. Henry A. Moody, both of Mobile. The associate editors are Drs. John A. Witherspoon, William D. Haggard, Worcester A. Bryan, William Litterer and James M. King, all of Nashville, Tenn. The journal will be conducted on the same high-class lines as before.

The Cartwright Prize.—The Cartwright Prize, valued at $500, biennially awarded by the Association of the Alumni of the College of Physicians and Surgeons, New York City, will be next awarded at the commencement exercises in 1911. Essays to be held worthy of the prize must contain original investigations made by the writer; must be on medical, surgical, or kindred subjects; must be typewritten and in English, and marked with a device or motto, and accompanied by a sealed envelope similarly marked, containing the name and

address of the author. The payment of the prize money to the successful essayist will be made on his filing with the treasurer of the association a printed copy of the essay. Essays in competition must be sent to Dr. Henry E. Hale, secretary of the Association, 770 West End Avenue, New York City, on or before April 1, 1911.

FOREIGN NEWS

Other Deaths in the Profession Abroad.—General H. Laub, surgeon-general of the Danish army, died November 12, aged 72, from cancer of the rectum. Since his appointment in 1902 as chief of the medical department, it has made great progress under his initiative.——The cable also brings word of the death of Professor Henri Huchard of Paris, an authority on diseases of the heart, aged 66. He founded about 1887 the *Revue Clinique et Thérapeutique* and later the *Journal des Praticiens*, and some of his works on the circulatory system and on neuropathology are text-books in regular use.

Death of Mosso.—The leading physiologist of Italy and a pioneer in the physiology of life at high altitudes, Prof. A. Mosso, professor of physiology at the university of Turin, died November 24, aged 64 years. He founded the *Archives Italiennes de Biologie* in 1882 to present in French the results of the research of Italian workers in this line; much of his own work was published also in Virchow's *Archiv*, especially his monographs on the circulation, respiration, ptomains and functions of the bladder. Among his books are "Fear," "Fatigue," "Temperature of the Brain" and "Man in the Higher Alps." He was long a senator, and for his advocacy of athletics was called "the apostle of physical exercise." He was also instrumental in founding the Monte Olen international institute for nature study above the snow-line.

Cholera.—No cases of cholera have been reported to the sanitary authorities since last June from Spain, Portugal and some of the South American countries; nearly every other country, however, has had cases either in ships in the harbor or on land, but except in the endemic foci no serious epidemic has developed although conditions were threatening in Italy for a time. Naples had 329 cases, with 131 deaths between September 25 and November 8, but no new cases have been reported from Naples since November 16 and vessels are resuming their schedules. Fourteen provinces of Italy are now infected with cholera, the total number of cases outside of Naples in the six weeks ending November 16, amounting to 536 with 234 deaths, but only forty-four cases were reported throughout the kingdom during the following week and none in Naples or Rome. No cases have been reported at any time north of Rome and only a few cases have occurred there. In Russia the number of officially reported cases by November 19 had reached 213,941, with 99,882 deaths. In the countries immediately adjoining Russia to the west the occasional imported contagion is speedily stamped out and no serious trouble has resulted, although Hungary had recorded 288 cases with 139 deaths by October 15.

CANADA

Hospital Burns.—The Toronto Free Hospital for Consumptives, Weston, was totally destroyed by fire, December 1, with a loss of $100,000. The ninety-two patients were all removed without casualty.

War on Opium.—A bill was introduced into parliament, November 30, by Mackenzie King, minister of labor, making it a punishable offense to use opium except for medicinal purposes. The present laws prohibit the importation, sale, or manufacture of opium.

Cholera on Royal George.—Dr. J. George Adami, Montreal, announces, that although there was a real case of cholera diagnosed on the steamer *Royal George*, there is no reason for anxiety, as the cholera microbe is practically harmless in cold weather. The thirty-seven steerage passengers have been released from detention and sent to their respective destinations.

Two Canadian Periodicals Unite.—The merger of the *Montreal Medical Journal* into the *Canadian Medical Journal*, the official organ of the Canadian Medical Association, which was announced in these columns October 1, is accomplished. With the December issue, the *Montreal Medical Journal* ceased to exist as a separate publication. The first issue under the new arrangement will appear in January under the editorial management of Dr. Andrew MacPhail, Montreal.

Society Elections.—The Winnipeg (Man.) Clinical Society has elected the following officers: president, Dr. James G. Munroe; vice-president, Dr. Julius E. Lehmann; secretary, Dr. Oscar C. Dorman; treasurer, Dr. Raymond S. Brown, and executive committee, Drs. John H. R. Bond, W. H. Reilly and Fred A. Young.——The following territorial members of the Ontario Medical Council have been elected: Drs. George R. Cruickshank, Windsor; Albert B. Welford, Woodstock; Alexander D. Stewart, Fort William, and Thomas W. G. Young, Peterboro.

Hospital Notes.—The Saskatchewan government has decided to locate the new provincial hospital for the insane at Battleford, and has voted $100,000 for the purpose. The land has been secured and building operations will begin in the spring.——Guelph, Ont., is to have a tuberculosis hospital.——A new children's hospital is to be erected in Hamilton.——A tuberculosis sanatorium is to be installed at Windsor on the old Iler homestead.——Mrs. Jordan of Boston, Mass., has informed the New Brunswick government of her intention to present the property at River Glade, consisting of 700 acres with a large three-story house and several other buildings, valued at $30,000, to the government to be used as a tuberculosis hospital.

Personal.—Dr. Murray MacLaren, St. John, N. B., has returned from abroad.——Dr. Hugh L. Dickey, Van Anda, B. C., has removed to Honolulu, H. T.——Dr. Everind A. Kirkpatrick, Halifax, is convalescent after severe illness.——Dr. John C. Mitchell has been transferred from Brockville Hospital for the Insane to the Coburg institution.——Dr. Edmund E. King, Toronto, has been reelected a member of the Ontario Medical Council for East Toronto.——Dr. David J. Dunn has been appointed school health officer of Edmonton, Alta.——Drs. Pierre A. Valois and Joseph A. Beaudouin have been appointed civic health officers of Lachine, P. Q.——Dr. Bruce L. Riordan, chief surgeon of the Grand Trunk Railway, Toronto, is seriously ill with typhoid fever.——Dr. Richard J. Monahan, Glace Bay, N. S., has been appointed senior surgeon of the Canadian Naval Service.——Dr. Bruce Hill, Winnipeg, who sued the Winnipeg Electric Railway Company for damages for injuries received while a passenger, has been awarded $2,000 and costs.

LONDON LETTER

(From Our Regular Correspondent)

LONDON, Dec. 3, 1910.

Quackery and Nostrums in Great Britain

There are signs that the government will abandon the indifference which has rendered this country an unrestricted happy hunting-ground for quacks and nostrum exploiters. Recently the government sent forms to the 1,600 health officers of the United Kingdom inviting their opinion on "whether the practice of medicine and surgery by unqualified persons is assuming larger proportions and as to the effect produced by it on the public health." The result is embodied in a recent report. On the whole the answers do not point to a large increase in unqualified practice, though such might have been expected from the profusion of advertisements of quack remedies and "specialists." The increase seems to be most marked in large centers of population, but curiously, quackery appears to flourish less in London than in provincial towns. The most extensive form of unqualified practice is prescribing by pharmacists, which is practically universal. They constantly prescribe for minor ailments or what are believed to be minor. The poor are particularly fond of resorting to them because it costs less than going to a doctor. In some districts a doctor seldom sees a child of the working class which has not been purged or otherwise treated for several days by a pharmacist. Diseases of the skin, the eye, and venereal diseases are much treated by pharmacists, who often also undertake dentistry, and are the chief agents for the sale of nostrums. But they sell the latter only when demanded; they prescribe their own preparations if possible, for the profit on their sale is much greater. Next to pharmacists come "herbalists"—persons with no pharmaceutical qualification whatever, who sell herbs and other drugs as far as the law allows. The only restriction they suffer under, compared to pharmacists, is that they cannot sell poisons. They are numerous and rapidly increasing in the large manufacturing towns of Lancashire and Yorkshire. As they have no legal status they are more reckless than pharmacists. They treat all sorts of diseases, and even visit patients—a thing seldom done by pharmacists. "Bone-setters" are extensively in vogue in some parts, especially in mining districts, and some of the large friendly societies even accept their certificates as equivalent to that of a physician. Of the more fantastic sorts of quackery "Christian Science" is increasing in several northern towns.

In Yorkshire and Durham the practice prevails of diagnosing and treating ailments by persons in a hypnotic state. One great evil from unqualified practice is the spread of infectious disease from failure to diagnose it. Cases are quoted of smallpox, diphtheria, scarlet fever and other diseases being spread in this way. In cancer valuable time is lost because the disease is not recognized in its early stage and is then treated by useless drugs.

A large section of the report is devoted to nostrums. These are purchased extensively by all classes, rich as well as poor. The facility with which they can be obtained is strongly condemned. They have enormously increased the amount of self-drugging, and in the case of incipient disease, such as phthisis, they often give rise to delay until the condition is incurable. The suggestion is made that the composition of all advertised remedies should be stated, that their analysis should be determined by government analysis at the vendors' expense, that the sale of headache powders and similar drugs should be prohibited, and that the sale of infants' food should be regulated. For the other forms of unqualified practice no remedies are suggested, and it is difficult to see how they could be. In this country the liberty of the individual is held so high that it would be impossible to prevent a person who is ill from taking any advice from any one he wishes. The quack labors under only one disadvantage compared with the physician. If a patient dies under his treatment he is liable to be indicted for manslaughter. But this scarcely ever happens, as medical advice is generally sought before the end. If it does happen, he is generally acquitted, as he is held to have done his best and the jury come to the conclusion that medical advice would not have saved the patient.

PARIS LETTER

(From Our Regular Correspondent)

PARIS, Nov. 25, 1910.

Protection of Infancy Against Tuberculosis

The eighth general assembly of the organization called La Préservation de l'enfance contre la tuberculose, founded by the lamented professor Grancher, was recently held under the presidency of Dr. Roux, director of the Pasteur Institute. The purpose of the organization is to remove children of tuberculous families from danger of infection, and to place them in the country among the families of healthy peasants living under good hygienic conditions. Only absolutely healthy children, aged from 3 to 13, are accepted. The organization has at present a budget of $31,000 (155,000 francs), and has twelve offshoots in the principal cities of France. It has 425 protégés distributed in the provinces. When the guardianship of the society ceases, the children often remain as agricultural laborers in the localities where they have been placed.

Election of Two Correspondents of the Academy of Medicine

In its session of November 22, the Académie de médecine elected, as national correspondents, Dr. Lebayle, former intern of the Paris hospitals, dean of the Léon medical school at Nicaragua, and Dr. Oui, professor of obstetrics and of the hygiene of early infancy at the Lille medical school.

Cholera and a New International Sanitary Conference

In response to a question from a member of the Chamber of Deputies, the minister of the interior has officially made a statement to the effect that the question of a new international sanitary conference has been under consideration for some time. Before undertaking a revision of the agreements obtained at the last sanitary conference it is indispensable to make sure that Turkey, which by its geographical situation and the movements of Musculman pilgrimages, is particularly exposed to the importation of epidemics, should consent to conform to the international sanitary regulations. Accordingly the minister of foreign affairs has used his influence to induce Turkey to enter into the sanitary union. It seems now that Turkey will be disposed to accede and to call a new sanitary conference soon at Constantinople. If these intentions are not realized the initiative no doubt will be taken by one of the governments which are parties to the sanitary union.

Honor to Professor Pinard

A few days ago the friends and pupils of Professor Pinard met in the great amphitheater of the medical school to celebrate the twentieth anniversary of his professorship. Speeches were made by Professor Landouzy, dean of the medical school, and by Drs. Potocki and Segond. At the end of the ceremony, a commemorative medal was presented to Professor Pinard.

BERLIN LETTER

(From Our Regular Correspondent)

BERLIN, Nov. 24, 1910.

Personals

The Prussian Academy of Science has elected the well-known London surgeon, Sir Victor Horsley, and A. Mosso, professor of physiology in Turin, as corresponding members. The Bavarian Academy of Science has elected Professor Gruber to regular membership.

Bavarian Antituberculosis Association

November 20, a national association for the suppression of tuberculosis was founded in Munich, the function of which will be a systematic campaign against tuberculosis as a disease of the people. The Prince Regent has given the association $1,000 (5,000 marks). At the close of the meeting a tuberculosis museum was opened.

Medical Study Trip

The German central committee for study trips plans an excursion to America for 1912 in connection with a visit to the International Hygienic Congress at Washington. The journey is to last about six weeks and to cost from $400 (1,650 marks) up, according to the cabin occupied. The price includes fare on land and sea and lodging and service while in America.

Illegitimacy from the Social Standpoint

A few days ago one of the speakers at the meeting of the German Morality Society (*Sittlichkeitsverein*) reviewed the subject of the social significance of illegitimacy in the light of statistics. He first exhibited the varying degrees to which the evil was present among various nations. The Netherlands have 2.5 per cent. of illegitimates, Switzerland 4.5, Prussia 9, Saxony 12, Bavaria 14 and Austria above 14. In the same country differences are found. Thus North Bavaria has 9 per cent., South Bavaria, 20. Further differences may be noted between town and country. Vienna and Munich have quite 30 per cent. of illegitimate births, but it must be noted here that the lying-in institutions in large cities influence the statistics unfavorably. The first factor in the etiology of illegitimacy is the special make-up of the population, the proportion of unmarried members of both sexes. The probability of illegitimate births is greater, the greater the number of the unmarried, the young, and particularly of young females in the population. The Westphalian industrial district, Istria and Dalmatia, in which there is an overplus of men, show only from 3 to 4 per cent. of illegitimate births. In the Alps and certain agrarian districts in which marriage is commonly entered into late, there is a high percentage of illegitimacy. Economic and social conditions also exercise an influence. The difference between the social relations and the trade conditions of town and country are not without their effect. The observation has been made that four-fifths of the illegitimate mothers in the city are from outside and come mostly from simple conditions of life to fall victims to the complicated relations in the great city. Half of the illegitimate mothers in the city are orphans (*cervoist*). Finally, ethical conditions, education and race have their effect, thus the Bavarians have the highest rate of illegitimacy.

The speaker also discussed the situation and fate of illegitimate children. These children are in greater danger than the legitimate, even after birth, and show a larger ratio of stillbirths. In Prussia 34 per cent. of illegitimate children die in the first year of life as compared with 18 per cent. of the legitimate. In Berlin the ratio is 39 to 19 per cent. As a matter of fact, the percentage is still more unfavorable and, if the children legitimized in the first year are accounted for, must be placed as high as 46 per cent. The causes of this mortality are the unfavorable conditions of care, the frequent change of nurses, and lack of proper support. In the first year of life not one-half are supported and at the age of 14, only 15 per cent. The frequent change of caretakers in later childhood leads to neglect. As a consequence of this, criminality is very large among the illegitimate, and their industrial training is faulty. Finally, the speaker discussed the ethical principles for the protection of the illegitimate. Support, titular guardianship and police oversight of the care of the infants are inadequate. The only remedy which is of actual value is trade union guardianship (*Berufsvormundschaft*). This can promptly bring the father of the illegitimate child to support it (in Strasburg 59 per cent. voluntarily supported their children, while 86 per cent. were reached by compulsory measures). This measure also makes possible a proper choice and supervision of the places where the children are cared for, and is financially favorable to the city, while it has also great ethical importance.

Marriages

CHARLES PIUS, M.D., Guadaloupe, Cal., to Miss Eloise Moore of Willows, Cal., November 24.

LUTHER RAYMOND POUST, M.D., to Miss Helen M. Alexander, both of Philadelphia, November 30.

ROY HOMER DYER, M.D., Marshall, Mo., to Miss Frances McClure of Houstonia, Mo., November 23.

EMIL E. NUSSLE, M.D., Chippewa Falls, Wis., to Mrs. Jessie Pottle Cox of St. Paul, Minn., December 7.

JAMES KEELEY EVERHART, M.D., Pittsburg, Pa., to Miss Susan B. Thorley of Harrisburg, Pa., October 22.

THOMAS B. COULTER, M.D., Chickasha, Okla., to Miss Hortense B. Rose, Avondale, Cincinnati, November 28.

Deaths

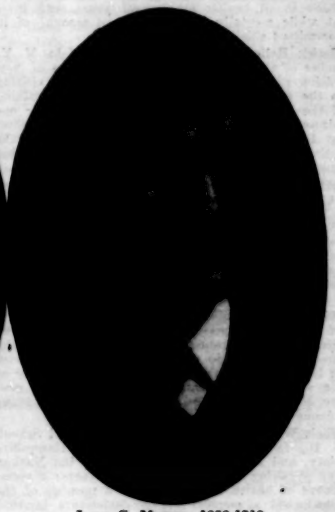
John Cummings Munro, M.D. Harvard Medical School, Boston, 1885; died at his home in Boston, December 6, from recurrent cancer, for which operation had been performed three years before, aged 52.

A Franklin medal scholar and graduate of the Boston Latin School Dr. Munro entered Harvard University in 1877, graduated in 1881, and received the M.D. degree from Harvard Medical School four years later. Establishing himself in general practice in Boston, he soon began to specialize in surgery, developing a rare skill which placed him early in his career in the front rank of the profession. Dr. Munro was associated with the Harvard Medical School as assistant in anatomy from 1889 to 1893; assistant demonstrator of anatomy from 1893 to 1894; assistant in clinical surgery from 1894 to 1895; instructor in surgery, 1896 to 1902, and lecturer in surgery, 1903 to 1905. He was keenly interested in the development of surgery toward which his work was a great contribution. He was surgeon at the Boston City Hospital, 1893 to 1903; consulting surgeon, St. Luke's Home, 1901; special consulting surgeon Quincy Hospital, 1902; consulting surgeon, Framingham Hospital, 1905; surgeon to out-patients, Carney Hospital, 1891 to 1896; and surgeon-in-chief, Carney Hospital since June, 1903. He was a member of the American Medical Association and chairman of the Section on Surgery in 1909; Association of American Anatomists, American Surgical Society, Clinical Surgical Society, of which he was president in 1905; Boston Society of Medical Sciences, Boston Society for Medical Improvement, American Academy of Medicine, Southern Surgical and Gynecological Association, an honorary member of the Vermont Medical Society, the Canadian Medical Association, and the Philadelphia Academy of Surgery.

Dr. Munro belonged to the group of surgeons who went through a long apprenticeship in anatomy as a preparation for surgery. He was noted for his skill in dissection, and for the simplicity and clearness of his demonstration. To this anatomic training was probably due, in a large measure, the technical skill in operation which so distinguished him. He combined, however, with this technical skill, accuracy in diagnosis and remarkable surgical judgment. Entering into surgery at the beginning of the antiseptic period, he quickly acquired a thorough mastery of the details of the method.

Dr. Munro will best be known for his surgical clinic at the Carney Hospital which was instituted in 1903. The establishment of this clinic which carried with it responsibility for the entire surgical service of the hospital, was an important event, as it was the first permanent surgical service to be established in New England. The clinic, under Dr. Munro's guidance, quickly acquired a high rank among the surgical clinics in the country, and, of the surgical clinics in New England, was among the best known and the most frequently visited. His work there served a most useful purpose in various ways. It demonstrated the possibility of doing satisfactory surgery, successful in its results, with simplicity of plant and technic and with a minimum of red tape. In its instruction, it had to do with and reached not so much the undergraduate in medicine as the general practitioner, the worker in the surgical field, the visitor in search of sensible ideas and their application in the field of surgery. At this clinic true charity to the deserving poor was dispensed. The wide-spread abuse of the charity of the medical profession was here combated in the only way in which a successful struggle against it can be made, by refusing charity to those who do not merit it. Dr. Munro not only had strong convictions on this matter, but had the courage to put these convictions into practice in the face of much unfavorable and unjust criticism.

JOHN C. DA COSTA, 1834-1910



JOHN C. MUNRO, 1858-1910

Dr. Munro was well known both in this country and abroad. His contributions to the literature of surgery were numerous and on a variety of subjects. He wrote as he spoke, simply and clearly, and was always conservative and modest in stating his part. His skill as a surgeon was acknowledged by all. Back of it, however, and revealed to but few, were qualities of mind and heart that deserve more admiration than his skill and made the man even greater than the surgeon. Fearless honesty in all things, staunch loyalty to his ideals and to his friends, straightforwardness in his actions, simplicity and cleanliness of life, and modesty as to his self and his achievements were strong characteristics of John Munro. Keen in his observation of men and their methods, he was always charitable in his judgments of both. Traveled, well versed in general literature, appreciative of art in all its aspects, he made a most charming companion. His influence on his fellows was wide and stimulating. A hard worker himself, he incited younger men to action and his hand was ever ready to aid and to encourage them in honest endeavor.

Though naturally undemonstrative and retiring, he was a loyal and devoted friend, and the place he occupied in the affections of the many who knew and loved him for his worth will not be filled.

John C. DaCosta, M.D., a well-known gynecologist of Philadelphia, died at his home, December 6, from pneumonia complicated by arteriosclerosis, aged 76. As a young man,

DaCosta was a civil engineer, and was a member of the staff of engineers of the St. Paul and Duluth Railroad for about twenty years. At the age of 40 he took up the study of medicine in Jefferson Medical College, and graduated from that institution in 1878.

Immediately following his graduation, Dr. Da Costa became instructor in his alma mater and was then made demonstrator of obstetrics. He served for more than twenty years as visiting gynecologist to Jefferson Medical College Hospital, and on his retirement several years ago, was made emeritus gynecologist. He was visiting physician to the Lying-In Charity Hospital, and visiting gynecologist to St. Agnes Hospital. He was a member of the American Medical Association, president of the Philadelphia Obstetrical Society, and a fellow of the College of Physicians of Philadelphia.

Thomas Gill Nock, M.D. Syracuse (N. Y.) University, 1883; formerly a member of the American Medical Association; a member of the Medical Association of New York and New England Railway Surgeons; Society of the State of New York; mayor of Rome in 1904 and 1905, and for six years a member of the fire and police commissioners; three terms coroner of Onedia County; a member of the board of managers of the Utica State Hospital, and local surgeon to the New York Central Railroad Company; was found dead at his home, November 28, from strangulation, aged 51. Dr. Nock had been in ill health for several years, and it is believed that while mentally irresponsible, on account of ill health, he committed suicide.

John Frederick Haller, M.D. University of Buffalo, N. Y., 1888; a member of the Medical Society of the State of New York; consulting gynecologist to Jamaica Hospital; visiting physician to the Bushwick Hospital for Children; examining physician of the Department of Charities for Brooklyn; one of the organizers of the Swedish Hospital; a surgeon of volunteers during the Spanish-American War, attached to the Tenth U. S. Cavalry; died at his home in Brooklyn, December 3, from pneumonia, aged 48.

Abram Brothers, M.D. College of Physicians and Surgeons, New York City, 1884; a member of the American Medical Association, New York Academy of Medicine, and New York Obstetrical Society, founder and once president of the Eastern Medical Society; visiting gynecologist to the New York Post-Graduate and Beth Israel Hospitals; associate professor of Gynecology in the Post-Graduate Medical School; died at his home in New York City, October 13, from diabetes, aged 49.

Julius Poblman, M.D. University of Buffalo, N. Y., 1883; a member of the Medical Society of the State of New York; formerly assistant in the Museum of Natural Sciences, Buffalo, and later director; lecturer in physiology in his alma mater from 1883 to 1886, and from that time until 1896, professor of physiology; a specialist in diseases of the eye; elected general secretary of the German Society of Naturalists in 1888; died at his home in Buffalo, December 6, aged 62.

Jonah Nichols Woodward, M.D. Dartmouth Medical School, Hanover, N. H., 1880; a member of the New Hampshire Medical Society, and a member of the staff of the Nashua Hospital; city physician of Nashua for three years; a member of the board of health for four years; a member of the common council, and a member of the legislature in 1893 and 1909; died at his home in Nashua, November 28, from abscess of the liver, aged 54.

Benjamin Franklin Haskins, M.D. Bellevue Medical College, 1873; of La Junta, Colo.; formerly a member of the American Medical Association; a veteran of the Civil War; secretary for many years of the school board of Alamosa and La Junta, Colo.; division surgeon of the Denver and Rio Grande Railroad at Alamosa; and consulting surgeon to the Santa Fe Hospital, La Junta; died in Washington, D. C., October 4, aged 62.

Frederick Francis Kelly, M.D. New York University, New York City, 1888; a member of the Prince Edward Island Medical, Maritime Medical, and Canadian Medical Associations; a member of the city council of Charlottetown, and once mayor of the city; a member of the staff of the Charlottetown Hospital; died in that institution, June 5, from mastoid disease, aged 44.

William McAfee Hanna, M.D. University of Louisville, 1862; of Henderson, Ky.; assistant surgeon of Colonel Basil Duke's regiment, C. S. A., during the Civil War; formerly a member of the American Medical Association; for several years a member of the Henderson Board of Health; died in Letcher's Hospital, Henderson, November 28, from cerebral hemorrhage, aged 73.

Clarence W. Erwin, M.D. Medical College of the State of South Carolina, Charleston, 1880; of Erwinton, S. C.; corresponding secretary and treasurer of the Christian Church of South Carolina for twenty-two years; prominent as a planter and physician; died at the home of his brother in Allendale, November 23, from nephritis, aged 53.

William Allen Hubbard, M.D. Eclectic Medical College of Pennsylvania, Philadelphia, 1876; formerly hospital steward in the Freedman's Bureau, Pine Bluff, Ark., and later apothecary in the U. S. Marine-Hospital Service; later a practitioner of Billerica, Mass., and superintendent of Winchester Hall; died at his home in Boston, Oct. 22, 1909, aged 66. (Bu)

Julien E. Hequembourg, M.D. Rush Medical College, 1882; of Chicago; a member of the American Medical Association, and Physicians' Club of Chicago; attending physician to St. Joseph's Hospital, and the Daily News Sanitarium for Babies; died suddenly while making his rounds in St. Joseph's Hospital, Chicago, December 8, from heart disease, aged 54.

Oliver A. Harrison, M.D. University of Louisville, Ky., 1882; a member of the Mississippi State Medical Association; local surgeon for the Queen and Crescent System; who had been incapacitated from active service since last winter when he fell on the ice, fracturing his right femur; died at his home in Meridian, December 3, aged 65.

Montraville McHenry, M.D. University of Vermont, Burlington, 1878; a member of the Medical Society of the State of Pennsylvania, and a member of the House of Delegates from the Columbia County Medical Society at the 1910 meeting; died at his home in Benton, December 1, from cerebral hemorrhage, aged 74.

John H. King, M.D. University of Wooster, Cleveland, 1872; formerly of Butler and Saxonburg, Pa., and a member of the city council and school board of the latter place; died, November 26, near his home at Homeville, from injuries and exposure following an accidental fall over an embankment, aged 67.

Benjamin Williams, M.D. Medical School of Maine, Brunswick, 1864; assistant surgeon of the Eighth Maine Volunteer Infantry during the Civil War; and later state commander of the Grand Army of the Republic; twice mayor of Rockland, Me.; died in Prospect Harbor, Me., November 27, aged 75.

Francis Howe Munroe, M.D. New York Homeopathic Medical College, New York City, 1866; a member of the staff of St. Mary's Hospital, Passaic, N. J., and the Essex County Homeopathic Hospital; died at his home in Newark, N. J., November 29, from cerebral hemorrhage, aged 48.

Patrick Henry McHaven, M.D. Missouri Medical College, St. Louis, 1878; formerly of McClure, Ill., but for a few months a resident of East St. Louis; at one time a member of the staff of the Anna State Hospital; died at his home in East St. Louis, November 21, from pneumonia, aged 58.

Andrew Jackson Sibley, M.D. University of Tennessee, Nashville 1894; a member of the State Medical Association of Texas; one of the board of censors of the Seventh Councilor District Medical Society; died at his home in Creedmoor, June 29, from cerebral hemorrhage, aged 45.

Wear F. Armstrong, M.D. Southwestern Homeopathic Medical College, Louisville, Ky., 1899; a member of the American Medical Association; died at his home in Henderson, Ky., September 12, during an injection of antistreptococcus serum for an infected operation wound, aged 36.

James J. McKone, M.D. Bellevue Medical College, 1887; a member of the American Medical Association; surgeon to St. Joseph's Hospital, Tacoma; acting assistant surgeon, U. S. P. H. and M.-H. Service; died in his apartments in Tacoma, November 27, from pneumonia, aged 47.

Alonzo R. Todd, M.D. Jefferson Medical College, 1880; of Ocean Grove, N. J.; formerly of Baltimore; a member of the Ocean Grove Board of Education; died at the Jefferson Hospital, Philadelphia, November 25, after an operation for the removal of gall-stones, aged 55.

Joel Hill, M.D. College of Physicians and Surgeons, Baltimore, 1880; a member of the Medical Society of the State of North Carolina, and Association of Surgeons of the Southern Railway; died at his home in Lexington, November 22, aged 55.

Harold B. Harchant, M.D. McGill University, Montreal, 1910; of Victoria, B. C.; died at the Terminal City Hospital, November 17, from injuries received while leaving the Britannia Mine, Howe Sound, the day before, aged 28.

Wash Miller, M.D. University of Louisville, 1866; of Winchester, Ky.; for many years president of the Citizens National

Bank in that city; died at the Brown-Proctoria Hotel, Winchester, October 27, from angina pectoris, aged 71.

William Perry Bennett, M.D. Washington University, St. Louis, 1844 or 1845; a well known physician and clergyman of Daviess County, Ky.; died at the home of his son in Utica, October 29, from senile debility, aged 87.

Edward G. Cannon, M.D. Louisville; a veteran of the Mexican War; at one time a circuit rider in southeastern Kentucky; for ten years a resident of Nome, Alaska; died in that place, November 21, from pneumonia, aged 87.

John Henry Arnold (years of practice, Arkansas); for many years a practitioner of Indian Territory; a veteran of the Civil War; died at his home near Henderson, Okla., December 1, from bronchopneumonia, aged 62.

Samuel A. Huffman, M.D. St. Louis College of Physicians and Surgeons 1896; formerly president of the Macoupin County (Ill.) Medical Society; died at his home in St. Louis, November 24, from heart disease.

Robert G. Simpson, M.D. Medical College of Ohio, Cincinnati, 1876; of Modesto, Cal.; formerly of Rising Sun, Ind.; died at the home of his nephew in Modesto, December 1, from heart disease, aged 64.

John M. Sweezy, M.D. Cincinnati College of Medicine and Surgery, 1860; of Cross Plains, Ind.; died in the Madison Sanitarium, Versailles, Ind., November 29, from senile dementia, aged 81.

Charles Butler Stiles, M.D. University of Edinburgh, 1887; died at his home in Hillview, N. Y., November 19, from injuries received from a fall over a steep embankment, aged 49.

Everett Grover Cleveland Snyder, M.D. University of Louisville, 1910; an intern in St. Vincent's infirmary, Little Rock, Ark.; died in that institution, October 17, from typhoid fever, aged 26.

George Frederick Emery, M.D. Queens University, Kingston, Ont., 1889; an eye, ear, nose and throat specialist of Ottawa; died at his home, November 23, from disease of the intestines, aged 43.

Thomas Rhoades Austin, M.D. Eclectic Medical Institute, Cincinnati, 1877; a veteran of the Civil War; died at his home near Neosho, Mo., November 12, from paresis, aged 69.

John Henry Bass, M.D. Louisville, 1859; surgeon in the Confederate service during the Civil War; died at his home in Abilene, Tex., November 14, from tuberculosis, aged 71.

F. Emile Gilbert, M.D. Laval University, Quebec, 1900; a member of the Société Médicale de Quebec; died at his home in Fraserville, Que., October 15, from pneumonia, aged 36.

Albert E. Auringer, M.D. Hahnemann Medical College, Chicago, 1888; of Mendota, Ill.; died December 4, while making a professional call, from cerebral hemorrhage, aged 53.

John E. McCune, M.D. Ohio, about 1850; died at the home of his niece in Plain City, Ohio, October 30, from senile debility, aged 84.

Pharmacology

ANADOL MISBRANDED?

The United States District Attorney in Chicago has filed information against C. G. Wheeler of the Wheeler Chemical Works, Chicago, for misbranding "Anadol." This nostrum, our readers will remember, was exposed by the Association chemists in THE JOURNAL, May 21, 1910, p. 1704. Anadol is one of those vicious mixtures which physicians are asked to prescribe, and which contain the dangerous, though if rightly used valuable, drug, acetanilid; yet there is no statement in the advertising matter or on the label to indicate its actual composition. Happily such preparations are gradually becoming extinct, and the Council on Pharmacy and Chemistry, and the Chemical Laboratory of the American Medical Association are to be credited, in great part at least, for this change in conditions. Of course, our expose of this nostrum did not prevent its being advertised to, and prescribed by, those physicians who prefer to depend on the "literature" of proprietary promoters. But this action of the government will certainly put an end to this product, so far, at least, as interstate commerce is concerned.

[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF THE AMERICAN MEDICAL ASSOCIATION]

TABLETS OF BISMUTH, OPIUM AND PHENOL

A Second Examination Which Illustrates the Limitations of Tablet Compounding

W. A. Puckner and W. S. Hilpert

More than two years ago the examination of tablets of bismuth, opium and phenol was taken up in the Association laboratory to determine the reliability of pharmaceutical preparations of complex formulas, more or less difficult to prepare. The result of this examination, published in THE JOURNAL, July 25, 1908, p. 330, showed that the tablets sold by different firms contained amounts of phenol ranging from 72.65 per cent. down to 12.66 per cent. of the amount the tablets were claimed to contain. In discussing this discrepancy three questions may be asked: 1. Are these supposedly reputable firms deliberately selling these products below standard? 2. Are these firms unable to determine the quality of their product? 3. Do these firms merely neglect to determine the composition of the finished product? In other words are these firms dishonest, incompetent, or merely negligent? Considering the standing of the firms named in the report one would hesitate to say that these discrepancies were due either to dishonesty or to incompetence and would be inclined to take the more charitable view of negligence.

Two years having elapsed and the report of the laboratory having been given the widest publicity, it would seem that if these firms were ignorant of the real composition of their product at the time the examination was made and published, they would by this time have had ample opportunity to correct the matter, and either to have brought the products up to the claim or else to have discontinued their sale.

To determine whether the discrepancies pointed out in the report referred to could be ascribed to ignorance and whether the firms had made any effort to improve the quality of the products, specimens of these tablets as sold by each of the firms concerned in the first report were again purchased from one of the large wholesale drug houses and their phenol content again determined.* The following table gives the result of this examination:

Manufacturer.	Per cent. phenol according to on label.		Per cent. phenol found.		Amount found expressed as per cent. of amt. claimed.[1]		Percentage of variation (plus or minus) between 1908 and 1910 findings.
	1908	*1910*	*1908*	*1910*	*1908*	*1910*	
Hance Bros. & White	8.45	8.19	1.85	2.80	21.89	34.19	+ 12.30
W. S. Merrell Chem. Co.	6.30	6.91	3.08	3.98	48.89	57.59	+ 8.70
H. K. Mulford Co.	1.72	1.70	0.90	1.08	52.34	63.53	+ 11.19
Parke, Davis & Co.	6.08	5.42	...	2.54	70.23	46.86	— 23.37
Sharp & Dohme	8.41	8.40	6.11	4.43	72.65	53.39	— 19.26
F. Stearns & Co.	7.27	7.51	1.93	1.74	26.55	23.17	— 3.38
Truax, Greene & Co.	10.03	10.00	1.36	2.81	13.69	28.09	+ 14.40
H. K. Wampole & Co.	8.98	8.80	3.49	4.73	39.31	53.75	+ 14.44
W. R. Warner & Co.	12.08	12.15	1.53	1.49	12.66	12.27	— 0.39

1. These figures were calculated from the claimed phenol-content of each tablet and the average weight of the tablets found.

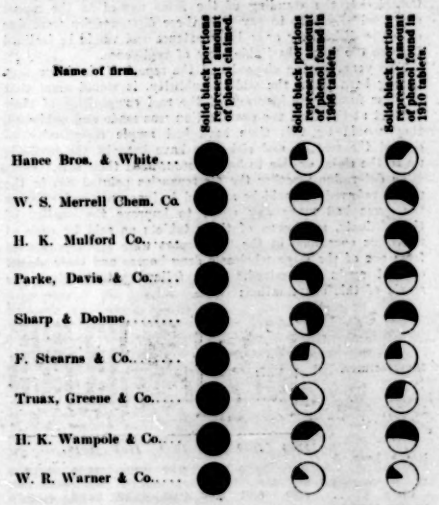
2. These figures were calculated from the percentage of phenol claimed (Column 1) and the percentage found (Column 2).

From the above results it is seen that at the present time the phenol-content of the tablet now ranges from a maximum of 63.53 per cent. down to a minimum of 12.27 per cent. of

* For method of analysis see "Method B," in "Reports of the Chemical Laboratory of the American Medical Association," I, 28.

that claimed on the label. The products of some of the firms have improved somewhat, while the products of others are worse than they were two years ago. On the whole, it seems that many of the firms still sell these products without being greatly concerned as to their composition. But one firm, whose product contains nearly two-thirds (⅔) of the amount of phenol claimed, the H. K. Mulford Co., appears to have considered the past report. The trade package now bears the following legend: "The amount of phenol in this tablet on account of its volatile nature is approximate." It would seem then, that, of the three alternatives suggested, the one ascribing this discrepancy to negligence must be discarded and the profession must decide whether it is to be attributed to incompetence or dishonesty.

EDITORIAL NOTE:—The findings of the Association chemists are not creditable to the pharmaceutical manufacturers concerned. The question asked is a serious one. Regarding at least most of the firms the charge of incompetence would hardly hold, since they employ chemists who are men of standing and are known to be entirely competent to control the manufacture of their products. To say that these firms are dishonest in the matter is a serious charge and no one


Name of firm.
Solid black portions represent amount of phenol claimed.
Solid black portions represent amount of phenol found in 1908 tablets.
Solid black portions represent amount of phenol found in 1910 tablets.
Hance Bros. & White...
W. S. Merrell Chem. Co.
H. K. Mulford Co.....
Parke, Davis & Co.....
Sharp & Dohme.....
F. Stearns & Co.....
Truax, Greene & Co.....
H. K. Wampole & Co....
W. R. Warner & Co.....

The above chart presents the findings of the Association chemists in a graphic form and shows the great discrepancies between the claims made for the tablets and the actual facts. The solid black portions represent the phenol-content. In the first column is given the phenol content claimed by the manufacturer; in the second column is shown the actual phenol-content found in the tablets purchased in 1908, while the third column represents the phenol-content as found in the tablets purchased in 1910.

will believe for a moment that they deliberately used a deficient amount of drug for the sake of saving a few paltry cents in the manufacture of these tablets. We would be inclined to take the view that these firms have little respect for physicians who use such complex mixtures; that, though producing, as a general rule, reliable and honest medicines they believe that in the case of products such as these, scientific accuracy is a waste of time. Perhaps they are right. At least, this should serve as a lesson to physicians who are inclined to use complex, ready-made formulas of this kind and persuade them to write individual prescriptions whose correct compounding by competent pharmacists may be depended on

Correspondence

Priority in a Method of Prevention of Perforation in Submucous Resection

To the Editor:—Nihil novum sub sole! In to-day's mail I received THE JOURNAL of November 19 containing (p. 1785) an article of mine entitled "An Original Method for Prevention of Perforation in Submucous Resection." In the same mail I received, from its author, Dr. William R. Murray of Minneapolis, a reprint of an article from the *St. Paul Medical Journal* of January, 1907, on "The Submucous Resection of the Nasal Septum for the Correction of Septal Irregularities," on page 4 of which I find this marked paragraph: "For this reason I prefer to make the incision through the cartilage a little posterior to the primary incision through the muco-perichondrium, if the character of the deviation will allow it, in order that the membrane on the convex side may cover any such accidental puncture of the opposite membranes."

The assumption of originality in my article was made in good faith. I evolved this method for my own use, absolutely without any knowledge that Dr. Murray had worked out practically the same principle in 1907. Now that he has so kindly and promptly brought his article to my attention, I gladly avail myself of this opportunity of giving him due credit for priority.

RICHARD M. NELSON, M.D.,
Colon Hospital, Cristobal, C. Z.

Thanksgiving Celebration of American Physicians in Vienna

To the Editor:—Many of the American physicians studying in Vienna decided to celebrate Thanksgiving Day in a befitting manner. Semmering with its beautiful surroundings offered them the greatest attraction and the Pension Alpenheim was secured for this festive occasion. Among those present were:

Dr. and Mrs. J. J. Durand, Atlantic City, N. J.
Dr. and Mrs. Charles A. Drake, Norwich, N. Y.
Dr. and Mrs. B. F. Dehs, New York.
Dr. and Mrs. E. C. Dalton, Valdez, Alaska.
Dr. and Mrs. S. M. Rinehart, Pittsburg.
Dr. and Mrs. A. C. Tingdale, Minneapolis.
Dr. and Mrs. Milton A. Shlenker, New Orleans.
Dr. Lee Edwards, Toronto, Canada.
Dr. F. O. Kershner, Clinton, Iowa.
Dr. George I. Barber, Chicago.
Dr. E. C. Wrightsman, South Chicago, Ill.
Dr. Joseph Schwarz, Mobile, Ala.

The physicians and their wives entered into the spirit of the occasion with great enthusiasm. Mrs. Lovasy, the hostess, announced dinner at 2 p. m., and surprised all with the banquet table dressed in the American colors. Flags and bunting and the beautiful ladies who graced the occasion made a picture which aroused the American patriotism of all present. After turkey, cranberry sauce and plum pudding were served, the health of the president and of the kaiser were toasted, and this was followed by a dance. M. A. SHLENKER.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

TREATMENT OF ACIDOSIS—CABOID FLOUR

To the Editor:—1. Is the presence of acetone and diacetic acid in the urine an infallible sign of severe acidosis? What do you think of the following case? In a married woman, aged 28, whose mother died of diabetes, diabetes was discovered about a year and a half ago. The patient was given Fowler's solution by her physician, but never put on a strictly starch-free diet. I saw her first Oct. 1, 1910, when the condition was as follows: Twenty-four-hour amount of urine, 50 ounces; 3.4 per cent. of sugar, no albumin, no casts. Sodium nitroprussid test for acetone strongly positive; ferric chlorid test for diacetic acid also very strongly positive. General condition of patient was very good; she felt fine and was not easily fatigued. I put her on Forchheimer's test diet and within two weeks the urine was entirely free from sugar, but there was still the acetone and diacetic acid, although I gave her 30 grains of sodium bicarbonate three times a day. Still she feels perfectly well and vigorous. On November 1 I started giving her two ounces of wheat bread daily. Sugar at once appeared in the urine, about 0.45 per cent. November 7 I changed to three ounces of bread made from gluten flour (40 per cent. of protein), allowing two ounces of oatmeal also. Sugar remains about 0.45 per cent. Twenty-four-hour amount has ranged from 48 to 65 ounces; specific gravity never

above 1.030, acetone acid diacetic acid constantly present in large amounts, and patient feeling perfectly well. Thirty grains of sodium bicarbonate, three times a day, has been continued from the start. What prognosis would you give? What treatment would you advise?

2. What do you know about "casoid flour," made in England, sold by T. Leeming, 43 Warren Street, New York, and represented as a starch-free flour? H. M. M.

ANSWER.—1. Oxybutyric acid, diacetic acid and acetone are known as the acetone bodies. According to present chemical opinion they are largely derived from the fatty acids and appear in the blood and in the urine when large amounts of fats are metabolized in the body. Being acid, they reduce the alkalies of the body and produce the condition known as acidosis. In many cases the formation of these acetone bodies is due to lack of food, without any failure to utilize sugar properly. These bodies also appear in diabetes when sugar formed from ingested carbohydrates, or from the proteins of the foods or tissues, cannot be utilized in sufficient quantity to maintain nutrition. When there is no failure to utilize sugar, acid in mild cases of indigestion, the administration of carbohydrates will prevent the formation of these acetone bodies. Acidosis produced by the acetone bodies may be either of a low grade, in which case it does not seriously affect the prognosis, or it may be extreme, in which case it portends the oncoming of diabetic coma. In the case described it would be impossible to give a reliable prognosis without quantitative measurements of the acidosis by determination of the amount of acetone bodies and of the acidity and ammonia content of the urine. Inasmuch, however, as the patient does not seem to be materially affected by the acidosis, a relatively favorable but guarded prognosis should be given. The treatment has evidently been correct and should be continued. An attempt, however, to find a carbohydrate that can be utilized by the patient would be desirable. We would suggest the trial of more oatmeal and less flour. It is evident that gluten flour, with 40 per cent. protein, still contains a very large proportion of carbohydrates. Potatoes might also be tried as a source of utilizable carbohydrate.

2. Analyses of casoid flour have shown it to be practically free from carbohydrates. The statement that it is entirely starch-free has not been true in the past, and on account of this unsubstantiated claim it has not been accepted by the Council. The casoid biscuit, or crackers, contain an appreciable, although small, amount of carbohydrates. Casoid flour, however, is not a gluten flour, but contains casein.

A CONVENIENT STAIN FOR THE SPIROCHETA PALLIDA

To the Editor:—I notice that in THE JOURNAL (December 10, page 2061) you give the Giemsa stain as an effective method for demonstrating *Spirochæta pallida*. While the results obtained with the Giemsa mixture are perfectly satisfactory, the time required renders it inconvenient. The following method, a description of which I published in 1903 (*Med. News*, 1903, lxxxiii, 246), gives the same results as the Giemsa and requires only ten minutes.

Smears of serum from the lesion are dried and fixed in strong methyl alcohol for two minutes. They are then stained for eight minutes, as follows: About 0.5 c.c. of a 1 to 1,000 aqueous solution of Grübler's eosin W G is placed on the surface of the smear. An approximately equal quantity of a 1 to 400 aqueous solution of Grübler's azure I is squirted on the slide from a pipette bottle and thoroughly mixed with the eosin. The exact quantities are unimportant. The staining mixture precipitates somewhat and should have a predominantly blue color. After eight minutes the slide is washed off in a strong stream of water. It will then be found to be stained perfectly as with the Giemsa method, and the *Spirochæta pallida*, if present, can be easily demonstrated.

This stain has been used by me and by my pupils for the past eight years as a general blood-stain, especially suitable for malarial parasites. The staining can be very considerably shortened, and for general purposes it is occasionally an advantage to use azure II, which contains some methylene blue, instead of the azure I.

FRANCIS C. WOOD, New York.

PRICES OF FOREIGN PUBLICATIONS

To the Editor:—Kindly let me know the subscription price and address of the *Presse Médicale* of Paris and the *British Medical Journal* of London. H. E. RANDALL, Flint, Mich.

ANSWER.—*British Medical Journal*, 429 Strand, London, England, $8 a year, including postage; *Presse Médicale*, 120 Boul. St. Germain, Paris, $3.75 a year, including postage.

The Public Service

Medical Department, U. S. Army

Changes for the week ended Dec. 10, 1910.

Eber, A. H., M.R.C., December 1, reported for temporary duty at Fort Dade, Fla.

Patterson, R. F., D.S., December 3, reported for temporary duty at Fort Thomas, Ky.

Stallman, George E., D.S., December 1, returned to Fort Sam Houston, Texas, from temporary duty at Fort McIntosh, Texas.

Halliday, Charles H., M.R.C., December 3, left Fort Fremont, S. C., on ten days' leave of absence.

Bowen, Albert S., lieutenant, December 8, left Fort Snelling, Minn., on ten days' leave of absence.

Sherwood, John W., M.R.C., December 5, reported for temporary duty at Fort Strong, Mass.; left Fort Andrews, Mass., same date.

Weston, Henry E., M.R.C., December 5, left Fort Strong, Mass., on thirty days' leave of absence.

Long, Charles J., D.S., December 9, reported for duty at Fort Andrews, Mass.

Trinder, J. H., M.R.C., December 8, reported for duty at Fort Jay, N. Y.

Medical Corps, U. S. Navy

Changes for the week ended Dec. 10, 1910.

Parker, E. C., surgeon, ordered to the naval academy.

Stuart, A., surgeon, detached from the naval hospital, Boston, and directed to continue duty at the navy recruiting station, Hartford, Conn.

Olson, G. M., asst.-surg., transferred to the retired list from Dec. 2, 1910; ordered home.

Randall, J. A., P. A. surgeon, and Brown, H. L., P. A. surgeon, detached from the naval hospital, Olongapo, P. I., and ordered home.

Thomas, G. E., asst.-surg., detached from the naval hospital, Canacao, P. I., and ordered to duty at the naval hospital, Olongapo, P. I.

U. S. Public Health and Marine-Hospital Service

Changes for the seven days ended Dec. 7, 1910.

Carmichael, D. A., surgeon, leave of absence for nineteen days from Nov. 15, 1910, amended to read eighteen days from Nov. 18, 1910.

White, J. H., surgeon, granted twenty days' leave of absence from Dec. 2, 1910, without pay.

Williams, L. L., surgeon, granted seven days' leave of absence from Dec. 2, 1910, under paragraph 189, Service Regulations.

Wertenbaker, C. P., surgeon, detail to represent the service at the meeting of the Seaboard Medical Association to be held in Kinston, N. C., Dec. 6-8, 1910, revoked on account of sickness.

Lavinder, C. H., P. A. surgeon, detail to represent the service at the meeting of the Seaboard Medical Association to be held in Kinston, N. C., Dec. 6-8, 1910, revoked on account of sickness.

Gwyn, M. K., P. A. surgeon, granted seventeen days' leave of absence from Dec. 24, 1910.

Creel, R. H., P. A. surgeon, relieved from duty in the bureau and directed to report to the director of the hygienic laboratory.

McKeon, F. H., P. A. surgeon, relieved from duty at Manila, P. I., and directed to proceed to San Francisco and wire arrival.

De Valin, Hugh, P. A. surgeon, directed to proceed to Chicago and report to the medical officer in command for temporary duty.

Ridlon, J. R., asst.-surg., granted fourteen days' leave of absence from Dec. 21, 1910.

Miscellany

Ehrlich's Instructions Concerning Salvarsan (606).—Under the date of Oct. 25, 1910, Dr. Ehrlich has issued a circular letter in which he gives his latest ideas as to the methods of administering "606." He says that over 40,000 ampullas of the preparation have been distributed and reports have been received concerning its use. These reports have pretty well settled the dose, indications and contraindications. It should not be used in cases of atrophy of the optic nerve, but may be applied in other syphilitic diseases of the eye, especially gummatous iritis, but should not be used in severe diseases of the nervous system or of the heart and blood-vessels. The first phase of the trial may, therefore, be considered as closed. We now begin the second period, which concerns the permanent results of the remedy. These will depend on a series of circumstances, especially the size of the dose and the method of application, and second, the nature of the disease. The permanent results will be greater, the more decided the first therapeutic impressions. This, naturally, increases with the size of the dose and the rapidity of absorption. From this standpoint, the most efficient methods are (1) intravenous injection; (2) intramuscular injection of an alkaline solution; (3) the markedly irritating acid injection, and (4) the so-called neutral emulsions. He considered that in the first phase the greatest freedom should be allowed to the experimenters in the choice of a method, as only in this way, by a comparison of results, could an idea of the relative value of the different methods be obtained quickly. But it has already been established that the methods most applied, either the intramuscular or subcutaneous injection of the neutral emulsion, have less value as far as permanent results are concerned. This may depend on the fact that it is more difficult to prepare these emulsions with absolute uniformity and minuteness of subdivision, which results in a variability in the rapidity of absorption; and in many instances the therapeutic effect by this method was not sufficiently intensive to secure in general the sterilization or destruction of the spirochete. The intravenous injection gives better results. The technic is simple

and in a proper selection of cases is free from danger, and for many patients much more pleasant. There have been over 1,000 cases already treated by the intravenous method. As an intravenous injection, Alt injects at least 0.3 to 0.4 or 0.5 gm.; some give still larger doses, 0.7 to 0.8 g.m. The intravenous injection can be repeated after two or three weeks, according to the need of the case, if the curative effect of the first injection is not complete and the Wassermann reaction is still positive. So far, indications of a hypersusceptibility have not appeared, although in many instances intravenous injections have been employed two, three, four or five times. Ehrlich says that the reports that have reached him indicate that the intravenous method deserves prominence over the other methods, especially the subcutaneous. He does not overlook the fact that this method will meet certain technical difficulties in ordinary practice; still it is important in the interest of patients to secure at once the most effective treatment. The intravenous method is therefore recommended by Ehrlich, at least for hospitals and clinics. The things to be especially considered are the following: 1. The disease should be put under treatment as promptly and early as possible, as it generally occurs in robust young individuals. They should be treated with at least 0.5 intravenously. In addition, it would be advisable, in the interest of actual sterilization, to employ an energetic local treatment, extirpation, cauterization or some of the other methods used. 2. In diseases of the central nervous system and the circulatory apparatus, so far as these are really suited to treatment, the greatest caution is advised, and small doses, 0.2 to 0.4, should be used; but whether in these cases the intravenous method does not deserve the preference over the forms of application heretofore used, has not yet been sufficiently determined. Ehrlich, therefore, advises that in the future, as far as possible, the intravenous injection should be used.

Medical Economics

THIS DEPARTMENT EMBODIES THE SUBJECTS OF ORGANIZATION, POSTGRADUATE WORK, CONTRACT PRACTICE, INSURANCE FEES, LEGISLATION, ETC.

The Legal Value of Vital Statistics

Mr. W. J. V. Deacon, statistician of the Kansas State Board of Health, in the *Journal of the Kansas Medical Society*, November, 1910, discusses vital statistics, with special reference to their legal and social value. As most discussions of this question relate to the medical and sanitary side of registration, this paper is especially deserving of attention by physicians. While too much cannot be said on the value of properly recorded and tabulated vital statistics as a means of "sanitary bookkeeping" and as a stimulus to hygienic reforms, it must be remembered that the recording by the state of births, deaths and marriages is of quite as much importance to the lawyer, the business man and the average citizen as it is to the sanitarian. Mr. Deacon lays special emphasis on the necessity of presenting the facts brought out by registration of vital statistics to the attention of the public and keeping these facts constantly in the foreground. He says:

"It has been said that vital statistics can make disease centers as obvious and as offensive as the smoking nuisance. They will not do this, however, unless they are advertised. The compilation of vital statistics as a matter of history is worse than useless and does not begin to furnish an adequate return for the time, money and effort put in their compilation. To be of real value, vital statistics must be a guide to our public-health officials, and to every public-spirited physician, in the campaign against disease. That the collection and publication of vital statistics is of great importance is a well recognized fact. In international statistics, practically every well-known European state is represented. In addition, I might mention such countries as New South Wales, Tasmania, New Zealand, Ceylon, Jamaica, Finland, Roumania, Bulgaria, Japan and Chili. The United States, as a whole, is not represented in international vital statistics."

Mr. Deacon gives three important reasons for recording births and deaths. These are: first, protection of the rights of the individual and of the community; second, the protection of the health and lives of the people; third, the knowledge of the movement of the population. After pointing out that statistical officers are usually under the direction of state or city boards of health and that, for this reason, the legal and social importance of vital statistics has been lost sight of, Mr. Deacon says:

"The interest of lawyers in this movement is generally because the very nature of their profession causes them to appreciate more quickly the disadvantages and financial hardships that individuals so often suffer, but this, like the interests of the physicians from a sanitary standpoint is not based alone on the professional interest of individual practitioners, though it is true that an orderly and authentic system of recording births and deaths would greatly facilitate legal procedure. The greatest benefit will result to the people themselves and not to any one profession."

Mr. Deacon gives seven provisions which should govern the registration of deaths:

1. Deaths must be registered immediately after their occurrence.
2. Certificates of death must be recorded.
3. Burial or removal permits are essential to the enforcement of the law.
4. Efficient local registrars are necessary.
5. The central registration office should have full control of the machinery and its rules should have the effect of law.
6. The transmission and preservation of returns should be provided for.
7. Penalties should be provided and enforced.

Mr. Deacon considers that one of the fundamental purposes of the proposed national department of health is the collection, compilation and use of vital statistics and repeats the three economic reasons given by Allen for the establishment of such a department. These are: first, to enable society to increase the percentage of exceptional men of each degree, many of whom are now lost through preventable accidents; and also to increase the total population; second, to lessen the cost of sickness; third, to decrease the amount spent on criminality that could be traced (if there were properly filed and reliable figures from which to draw conclusions) to overcrowded, unwholesome and unhygienic environment.

In discussing the influence of vital statistics on social problems, he says:

"Whenever the term 'statistics' is applied to social facts, it suggests action, social control of future contingencies, mastery of the facts whose actions are chronicled. The object of gathering social facts for tabulation is not to gather material for future historians; they are to be used in shaping future history. They are facts collected with a view to improving social vitality, to raising the standard of life and to eliminating permanently those forces known to be destructive to life. Unless they are used in this way they are of interest only to the historian. No city or state can afford to erect a statistical office to serve as a curiosity shop."

This portion of the paper concludes with an arraignment of Kansas which ought alone to be sufficient to secure the enactment of a proper registration law in that state at the next meeting of the legislature:

"Kansas, poor old Kansas! Bleeding Kansas! Bleeding money, wheat and corn at every pore. 'Tis said: A land of smiling sunshine, of winding streams, where you have but to tickle the soil to make it laugh a harvest. A land dotted with school houses and growing towns and villages, called cities by divine right of prophecy. A land of pigs given to adipose, of sleek cattle, of strong horses, of handsome women, of bouncing babies, of homely, rugged men. A land where no one dies except through accident or over-eating. Poor, bleeding Kansas cannot afford to pay 25 cents to register those bouncing babies and, while for years they have duly registered their fine pigs, their cows and their horses at an expense of from 50 cents to $10.00 each, they deny to the future citizen, the potential fathers and mothers of this great republic, the right of registration, the establishment of their legal birthright, for the pitiful sum of 25 cents.

"'Have you a little fairy in your home?' If you have she is not registered. No human eye can pierce the future and while you by study, industry and thrift may think to leave that 'fairy' far above the reach of the breakers of misfortune, who knows what may arise in the future to require that little one to prove herself your child, your heir and the right to exercise those sovereign rights of citizenship to which estate the little one has been born, and in which rights you to-day think her secure.

"The state owes to every citizen the right that the three principal events in the life of each of them shall be a matter of public record, and these three events are the birth, marriage and death. This state owes it to you to maintain these records, a duty it has shamefully neglected."

POSTGRADUATE COURSE FOR COUNTY SOCIETIES

DR. JOHN H. BLACKBURN, DIRECTOR
BOWLING GREEN, KENTUCKY

[The Director will be glad to furnish further information and literature to any county society desiring to take up the course.]

Fifth Month—Second Weekly Meeting

I. HYPEREMIAS OF THE SKIN

ERYTHEMA HYPEREMICUM: Erythema calorieum, e. solare, e. venenatum, e. ab igne, e. traumaticum. Symptoms and treatment.

ERYTHEMA INTERTRIGO: Chafing.

II. INFLAMMATIONS

ERYTHEMA MULTIFORME: Etiology. Symptoms: Constitutional symptoms, visceral manifestations, varied lesions.

ERYTHEMA NODOSUM: Etiology, symptoms.

ERYTHEMA SCARLATINOIDES: Symptoms and diagnosis.

PELLAGRA: Etiology. Symptoms: Disturbances of gastro-intestinal and cerebrospinal systems. Cutaneous lesions—three stages—congestion, thickening and pigmentation, atrophic thinning.

URTICARIA: Etiology. Symptoms. Varied lesions: Urticaria papulosa, u. gigans, u. bullosa, u. hemorrhagica, u. perstans, u. factitia. Treatment.

ANGIONEUROTIC EDEMA: Symptoms. Diagnosis. Treatment.

ECZEMA: Acute, subacute and chronic.

Eczema erythematosum, lesions, usual locations.

Eczema papulosum, lesions, locations, course.

Eczema vesiculosum, lesions, locations, course.

Eczema pustulosum, lesions, locations.

Eczema rubrum and e. squamosum; secondary conditions.

REGIONAL ECZEMA.

DIAGNOSIS: Redness; papule, vesicle, or pustule; discharge; crusts and scales; thickening and infiltration; itching and burning. Differentiate from scabies, herpes, dermatitis, impetigo contagiosa, sycosis, psoriasis, lichen planus.

Society Proceedings

ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES

Nineteenth Annual Meeting, held at Richmond, Va., Oct. 25-Nov. 4, 1910

The President, COL. JOSEPH K. WEAVER, N.G., Pa., Norristown, in the Chair

Officers Elected

The list of officers-elect was published in THE JOURNAL, November 5, page 1656. Milwaukee was selected as the place of meeting for 1911.

Reports of Officers

MAJOR HERBERT A. ARNOLD, N.G., Pa., treasurer, reported the largest number of paid-up members in the history of the organization—1,445—and that the balance in his hands was $5,826.41, or $429.09 more than for the previous year.

MAJOR CHARLES LYNCH, M.C., U. S. Army, secretary and editor, explained that the loss in advertising receipts was due to the acceptance of no advertisements except those approved by the Council on Pharmacy and Chemistry of the American Medical Association.

Department of Public Health

At the business meeting resolutions were adopted favoring the passage of Senate Bill 6049, now pending, or essentially similar legislation having for its object the establishment of a national department of health, of equal dignity and power with other departments of the government, having at its head a secretary of public health, a cabinet officer.

Pay for Organized Militia

On motion of COL. L. MERVIN MAUS, M.C., U. S. Army, a resolution was adopted asking Congress to provide that medical officers and members of the hospital corps of the organized militia receive an annual pay to the amount of 25 per cent. of the active pay of their respective grades as provided by the pay tables of the United States Army and Navy, besides mileage while under orders, and directing the committee on legislation of the association to confer with the similar committee of the National Guard Association, and to represent the conditions as they relate to medical officers with a view of obtaining an increased rate of pay for them.

Ethics, Scope and Prerogatives of Army Medical Officer

COL. L. MERVIN MAUS, M.C., U. S. Army, discussed this subject, which is of interest alike to medical officers of the regular establishment and to those of the organized militia. He outlined the advantages to be derived from the blending of the medical corps of the Army with the U. S. Public Health and Marine-Hospital Service, which would bring under one executive, public health, general and special sanitation, quarantine, hospital organization and management, the care of the sick, property responsibility, examinations, etc. He considers early military training of paramount importance to the medical officer, who should at least have a thorough knowledge of the principles of discipline, military drill and the essentials of command. The medical officer of to-day must be a man of collegiate education or its equivalent, an accomplished physician, a skilful surgeon, an expert in diseases of the eye, ear, nose and throat, a master of obstetrics, gynecology and pediatrics, an alienist, a past master in military hygiene and sanitation, and a thorough student of military regulations and customs, and army life. He must also be proficient in military law, to a certain degree in tactics, especially those relating to hospital corps and ambulance drills; he must understand the art of the architect and builder, the duties of judge advocate, quartermaster, commissary, paymaster, the command of hospitals, hospital ships and trains, ambulance companies and the multitudinous and varied duties connected with municipal administration in all of its complex branches. Among the important duties delegated to the medical officer is that of sanitation, whereby the medical officer becomes the army sanitarian in name, if not altogether in function. He is authorized to supervise the sanitation of the command to which he is attached and to recommend to the commanding officer such measures as he deems best for the health of all concerned. Colonel Maus suggests the greater use of the special sanitary report, instead of waiting and allowing the continuance of an insanitary evil until the monthly report is made. He urges that the recruitment of the army be placed in the hands of the medical corps, as the physical examination is the chief factor of the duties of the recruiting officer. He also believes that retiring boards should consist entirely of medical officers, who, by reason of education and training, are the only officers in the service competent to pass an opinion as to the physical condition of officers brought before such boards. The essayist does not approve of the term surgeon as a designation, preferring the more correct title of medical officer. He suggests that the following designations be made official: For an army in the field or a military tactical division or department, surgeon-general; for a division, division surgeon-general; for a brigade, brigade surgeon-general; for a general hospital, field

hospital, hospital ship, hospital train, post hospital or ambulance company, commanding officer; for a medical supply depôt, officer in charge; for a regiment or separate battalion, chief medical officer; and for other officers assigned as juniors, medical officer. Officers assigned to medico-military inspection or sanitary work should be designated medical inspector-general or sanitary inspector-general.

Vaccine Therapy

MAJOR HARLAN SHOEMAKER, M.C. N. G., Pa., Philadelphia, detailed his experience with natural as compared with artificial vaccine therapy, from which he concluded that bacterial vaccines can be undertaken without fear of unpleasant sequelae because the reaction is of short duration, and consequently there is no danger of injury to a vital organ; because the reaction is not so great as in a natural vaccination or inoculation of living germs; because the surgeon inoculates many patients with innumerable living germs without unfavorable results, and because the bacterial vaccine is dead.

(To be continued)

CHICAGO MEDICAL SOCIETY

Regular Meeting, held Nov. 9, 1910

The President, DR. ALEXANDER HUGH FERGUSON, in the Chair

The Ligation or Partial Extirpation of Exophthalmic Goiter

DR. CHARLES H. MAYO, Rochester, Minn.: There are two groups of cases of hyperthyroidism: first, the simple goiter without symptoms of hyperthyroidism; and, second, the group of cases in which the symptoms of hyperthyroidism constitute the main feature of the case. In cancer of the thyroid it is not uncommon to see marked hyperthyroidism—in fact, some cases have every symptom ordinarily classed as Graves' disease. As to treatment, from an operative standpoint, we will consider the operation of vessel ligation and one of partial extirpation of the gland. For the mild cases, or those seen early, is recommended the simple ligation of the vessels, nerves, and lymphatics at the upper pole, with a linen ligature. Following this procedure the reduction in the delivery and production of secretion seems to bring about that form of reversion of goiter toward the simple type, as demonstrated by MacCarty. The same treatment is indicated in the most advanced cases in which changes in the heart, liver, etc., have advanced to a most serious degree. In this group the improvement is very marked in all who recover from the operation, and the removal secondarily of the larger lobe and isthmus can be made with a marked degree of safety a few months later. Of the cases operated on by ligation who are below weight there is an average gain of 20 pounds in four months. The results from operations are about 70 per cent. cured, and the remainder greatly improved, although operated on at a time when serious and incurable conditions of other organs were present. The mortality for ligation of vessels is 3.7 per cent. The mortality in extirpation cases is 3.9 per cent. This includes the highest mortality of early work. During the past three years twelve patients have died without operation within the first eight days after their arrival in the city for operation, their morbid condition being too evident for surgical treatment at that time.

DISCUSSION

DR. ARTHUR DEAN BEVAN: I believe that the theory of Möbius has been definitely proved to be true, that exophthalmic goiter and the symptoms resulting from this disease are due to the oversecretion of the gland, or possibly, at times, to an altered secretion, and I think Kocher has shown, basing his work on the theory of Möbius, that in order to cure exophthalmic goiter, it is our duty to diminish to approximately normal the internal secretion of the gland. How is this to be done, and at what time are we to resort to operative interference? I have had the same experience that Dr. Mayo has had in losing patints after trying to do too much. I remember three very sick patients I lost in whom I removed one entire lobe and part of another, and I am rather inclined to believe if I had adopted the plan of Kocher, I would have succeeded in some case in saving the patients' lives. I believe in the very bad cases we should ligate one or two thyroid arteries. As to the technic, Crile adopts a rather stealthy way, without any knowledge of the patient beforehand. Some morning he comes into the room and ligates one of the superior thyroid arteries. I have not much sympathy with Crile's method of doing these operations without the full knowledge of the patient. After listening to Dr. Crile's persuasive argument one day I tried it on an intelligent woman, and she never forgave me. I believe that in almost all cases ether is to be preferred as the anesthetic. In some very bad cases cocain may be used in the following way: about an hour before the operation give hypodermically ¼ grain morphin and 1/150 scopolamin; then 1/1,000 solution of cocain should be employed with a little epinephrin added to it.

The technic which I have adopted has been to make a little incision about an inch and a half in length parallel with the normal skin folds in the neck just at the upper border of the thyroid gland, just in front of the sternocleidomastoid. The incision is taken down to the deep fascia; then the sternocleidomastoid is drawn to the side; then the omohyoid passes right in front of the artery. There is this little piece of surgical anatomy which you should remember, and that is, the artery below the hyoid bone is internal to the carotid and the sternocleidomastoid. You find the large artery before seeing the pole of the gland itself. Then you follow that down to the pole. In many of the cases the mere ligation of the superior thyroid will suffice. In the more radical operation of the removal of one lobe of the gland the procedure should be the Kocher incision, and ether anesthesia, as a rule. I think we owe a great deal to Dr. Mayo for showing us that ether anesthesia is quite as safe in the hands of an expert, as I firmly believe it is, as cocain, in the resection of the goiter. The incision should divide the skin, superficial fascia and platysma, and should be very well dissected up, so that a large flap may be made and held by the assistant with a retractor. Then the superficial layer of the deep cervical fascia should be divided in the middle line, and the sterno-hyoid and sterno-thyroid muscles should be drawn to one side. I always ligate the superior thyroid en masse, and then the inferior thyroid. I do not believe we should ever remove more than a single lobe, and if there is a large amount of thyroid left on the opposite side I believe we should complete the operation by the ligation of the superior thyroid on that side. We owe a great deal to Möbius, Kocher and Mayo for teaching us the pathology and treatment of exophthalmic goiter. I believe the time has come when we can say to the patients who have come to us, especially if they come early, "You have exophthalmic goiter; you can be cured by surgical operation with much less danger than by leaving the condition to Nature."

DR. J. HALPENNY, Winnipeg, Manitoba: After a slight amount of experience in experimental work with the parathyroid glands, one is compelled to conclude that at the present time they are not in the practical arena of surgery at all. There are various assumptions regarding those glands that are not fully borne out by experimental work. The statement has been made by many that if the parathyroid glands are all removed, in every case death follows from acute tetany. One is unable to find that this always occurs. One is told that if the parathyroid glands alone be removed death follows more quickly than if the thyroid be also removed with the parathyroid glands. This is not true. Death comes on more quickly with the complete operation than when the surgeon removes the parathyroid glands alone. One finds that when the thyroids are removed and the parathyroids are left behind, there is a certain change in the histologic structure of the parathyroid, so that it takes on the structure of the thyroid. In one animal the lobes of the parathyroids and in another animal the lobes of the thyroids in the two instances appear very similar. This would lead one to conclude that these glands are so closely related that the one is able to take up the work of the other to a certain extent.

In the literature one finds that the argument is put forward that the parathyroid glands are there to check up the thyroid glands; that they are not entirely a different structure, except that they are to check up the thyroid glands, and the statement is made that the probable explanation is this: the thyroid gland normally accumulates or secretes some toxic substance which the parathyroid glands destroy. Remove the parathyroid glands and the toxic substance accumulates very rapidly, and death follows by tetany. The fact that the resultant tissue very closely approximates the tissue when the thyroid is left behind makes it appear that these two glands have work of the same kind to do.

DR. D. W. GRAHAM: I wish to emphasize the use of a general anesthetic instead of local anesthesia in operating for goiter, especially for the exophthalmic type.

DR. L. SCHOOLER, Des Moines, Iowa: I was very glad to hear the essayist emphasize one point, and I think it will inure to the benefit of a large number of patients, and that is that all cases of goiter are not surgical cases. I have seen operation in a good many cases of goiter that in my judgment were not surgical cases. Life-saving operations in advanced cases of goiter are bad surgery. Operating when the patient is moribund will not help the statistics in this class of cases any more than it will in any other.

DR. ALEXANDER HUGH FERGUSON: I wish to ask Dr. Mayo to say something with reference to the class of cases in which thyroidism comes on every month or two or three months, and all the symptoms are directed toward the heart, and there is vomiting, with very little enlargement of the gland. There is no protrusion of the eyeballs, no tachycardia between times, no trembling of muscles, and no eye symptoms. I have had two or three such cases. One patient was supposed to die in an extreme condition of depression; he vomited, had diarrhea and became pulseless, but is slowly getting better. This patient was completely relieved by operation.

DR. C. H. MAYO: If you deem it better to do a thyroidectomy to begin with, and a relapse takes place, with a little enlargement of the left lobe, then it is advisable to ligate the artery and lymphatics on that side, leaving one artery and three veins to supply the gland. If we have not cured the disease, it does not mean that we are through with the patient. If a relapse takes place, the patient can be made better by resection or ligation first, and following after that, after taking out the right lobe, and afterward ligating the superior vessels on the left side, I have resected a part of the left lobe in four cases, using a mattress suture. We have many more cases of exophthalmic goiter in this country than they have in Europe. The operations in this country that have produced tetany have been mostly secondary operations on the remaining lobe. No cancer patient has been cured if there was involvement of the lymphatic glands of the neck. The exophthalmic cases can be improved once or twice with the *x*-ray, and then comes the operation.

AMERICAN ASSOCIATION FOR THE STUDY AND PREVENTION OF INFANT MORTALITY

(Continued from page 2089)

First Annual Meeting, held at Baltimore, Nov. 9-11, 1910

Philanthropic Prevention of Infant Mortality

DR. H. H. HART, New York City: A study made by the Russell Sage Foundation, at the request of Mr. Homer Folks, revealed the fact that accurate information with reference to the mortality of infants under the care of philanthropic institutions is greatly needed as a basis for preventive effort. Very little accurate information exists, and that which is obtainable does not exist in such form as to permit intelligent comparison. Thirty institutions, including infant asylums and other institutions which care for infants under 2 years of age, were visited. Statistics were obtained partly from published reports and partly from figures furnished by the superintendents of institutions. Reports received from twenty-two institutions showed that out of 50,451 children under 2 years of age received by the institutions, 22,743 died, a mortality of 40.3 per cent. In many instances the rate was higher, varying from 50 to 70 per cent. In one instance the head of an infant asylum reported that during the past twenty years the death-rate among children under 2 years was 75 per cent. The statistical reports of boards of health and of state boards of charity afford no usable material. Institutional statistics were found to be misleading, because of the practice of treating each year as a unit, and basing the death-rate on the entire number of children cared for during the year. For instance, one institution which had fifty infants on hand at the beginning of the year received 100 and had fifty deaths, an apparent death-rate of 33⅓ per cent. If, however, the statistics were considered for a series of years, the rate would be found to be nearer 50 per cent. An intelligent study of infant mortality should deal with infants under 1 year. The inquiry referred to revealed the fact that not only was there a lack of uniformity of recording the personal and medical history of infants under care, but that no system that could be considered fairly complete had been perfected for recording such histories. The individual study of each case is required.

The following conclusions have been reached as a result of the study up to the present: First, there is room for improvement in the care of infants even by the most conscientious societies; second, there is a surprising amount of ignorance of their wards by societies. Only a few have an accurate history of their wards, and only a very few have proper medical examination on admission; third, nurses and superintendents of infant asylums are eager for information which will enable them to give adequate care to the infants placed in their charge.

DISCUSSION

DR. W. C. WOODWARD, Washington, D. C.: Is there a record of mortality in the asylums?

DR. S. JOSEPHINE BAKER, New York: I have prepared a chart showing deaths in different localities in New York City, which brings out the fact that almost half of the infant mortality in the Borough of Manhattan is the institutional mortality. The real problem of the institution is not the breast-fed baby, but the bottle-fed baby. The boarding-out method of caring for babies should be elaborated more for the bottle-fed than the breast-fed baby. The bottle-fed baby boarded out in a home has a chance for life; 50 per cent. greater than if kept in an institution.

DR. W. C. WOODWARD: Does any one know of a community in which an official or public register is kept of available wet nurses? The suggestion has been made to me by Dr. Skinner of the Columbia Hospital in Washington, that the frequency of applications for wet nurses by people of means makes it desirable that such a register be kept.

MR. WALTER KRUESI, Boston: The Boston Floating Hospital instituted a system of collecting maternal milk last summer from mothers who could spare it. The hospital offered 50 cents a quart, but the mothers refused to accept pay, preferring to contribute it for any child who needed it.

MR. ROBERT W. BRUERE, New York City: The question of wages enters largely into the care of infants. Ten per cent. of the mothers in the New York Lying-In Hospital come from families in which the weekly income is $5 or less. A study of the records of 6,000 confinements in 1909 showed that 1,700 were without employment when the child came; in 10 per cent. the income was $5 or less; only about 5 per cent. had an income of $15; and one-fifth of the families represented in the study had children of wage-earning age. I question Dr. L. K. Frankel's assertion that maternal insurance is not needed in America because husbands usually support their wives adequately.

DR. L. K. FRANKEL: I object to a system of maternity insurance because I object to married women working. The average woman is doing her full duty to the community when she cares for the child she brought into the world. The economic conditions of the country should be readjusted so that the wage-earning power of the husband will be sufficient to enable him to support his family. The system of maternity insur-

ance developed in Germany and Italy takes into account the problem of the illegitimate child.

DR. LEONARD D. FREESCOLN, Philadelphia: The Philadelphia General Hospital is in touch with various charity societies, and looks out for foundlings reported through these societies. Wet nurses are usually obtained from the obstetric or gynecologic wards of the City Hospital. The women are required to take their babies with them. Pay is usually from $6 to $8 a week.

MRS. WILLIAM LOWELL PUTNAM, Boston: In Boston a plan has been followed of sending women out as wet nurses by day only; if for a longer time they take their own babies with them. The arrangement has made it possible to secure the services of a self-respecting class of married women.

DR. C. O. PROBST, Columbus, Ohio: There is a necessity for licensing boarding-out hospitals and places in which women go for confinement. Such a law is operative in Ohio. An examination is made of the place before the license is granted; no child born in such an institution can be placed anywhere in the state without the knowledge and consent of the authorities.

The Relation of Infant Welfare to the General Social Movement

MR. SHERMAN C. KINGSLEY, Chicago: The relation of infant welfare work to the general social movement is about the same as that of the baby to the adult population. The baby makes the population, and out of neglected babyhood come the individuals that furnish the task of charity workers, of reform agencies and those engaged in the general social movement. Infant mortality and poverty go hand in hand. The black dots on the map of any city marking the location of baby funerals will also lead to the homes of the poor. The worker who becomes acquainted with these families discovers the mother who must go out to work to earn a living for herself and children, who has been deserted by her husband, who lives in insanitary tenements, who lives in a part of the city where the problem of poor milk is at its worst, where the alleys are foulest and flies are thickest. There is no problem affecting the home which does not rest finally with the greatest severity on the baby, and the worst effects often even before it is born. The problem of social disease and race responsibility is perhaps never appreciated so fully as when one sees its effects and reads its lesson in the baby victim. Every activity in behalf of human life receives new significance and meaning when the problem of the family and the home is approached with reference to its fitness as a place to welcome and foster infant life.

DISCUSSION

MISS C. VAN BLARCOM, New York: One point not touched on in the paper is the relation of the midwife problem to the production of blindness among infants. About 50 per cent. of the births in Chicago are attended by midwives; 75 per cent. in St. Louis. Midwives in America are not trained women; with a few exceptions they are not well supervised. It is as important that the midwife be trained as the doctor or the nurse. Consequences of lack of training are shown in diseases which follow the trail of the midwife. European midwives are carefully trained.

MR. EDWIN D. SOLENBERGER, Philadelphia: Apropos of the relation of infant welfare work to the social movement, it is important that a definite plan of action be formulated for each community, with a certain part in it for each activity engaged in the campaign against infant mortality. A particular effort should be made under the department of health at the beginning of the hot weather to correlate and strengthen the agencies enlisted in the welfare campaign.

DR. S. W. NEWMAYER, Philadelphia: The plan referred to by Mr. Solenberger is carried out in Philadelphia. All the various organizations engaged in infant welfare work are organized into one central bureau which forms a clearing-house for the work. It would be difficult to enforce laws prohibiting the employment of women before confinement. It might be practicable to have the women visited by visiting nurses, the expense of this care and instruction to be borne by small subscriptions from the various factories.

MR. LOUIS LEVIN, Baltimore: A Jewish association in Baltimore which cares for women during their confinement sends trained care-takers into the homes while the mothers are incapacitated. Realizing the necessity for training the care-takers, arrangements were made in accordance with which the Hebrew Hospital agreed to open a training class for these workers. Instruction is simple, but enables care-takers to give intelligent attention to the needs of mother and child. The course is to cover one year. The present force of untrained care-takers receives $6 to $8 a week.

MISS C. VAN BLARCOM, New York City: The Central Midwives Board, appointed by act of Parliament in 1902, establishes standards for training schools. Examinations are required of pupil midwives trained in these schools. The training is analogous to that given to obstetric nurses in this country; the course includes elementary instruction in hygiene, anatomy and physiology.

Infants' Milk Depots and Infant Mortality

MR. WILBUR C. PHILLIPS, New York City: The milk depot is the fulcrum on which rests the lever of the situation—the instrument through which medical, social, educational and philanthropic prevention effect their purpose and achieve success. Operated as it should be, it is more than a depot from which milk is distributed. It is an educational center, a district branch for the dispensation of relief, and an indispensable coordinating unit between nurses, physicians, clinics, dispensaries, hospitals and various philanthropic institutions which concern themselves directly with the welfare of the child. We should have classes for mothers in infant hygiene; periodical consultations under the direction of physicians for weighing and examining the babies, and follow-up work in the home by visiting nurses. If infant mortality is to be prevented and not cured, the home must be the crucial place of attack. The work of infants' milk depots must be coordinate with the hospitals, clinics, dispensaries, floating hospitals, fresh-air homes, day nurseries and all the agencies which are interested in the baby problem. Before birth the depot nurse, through her intimate knowledge of these agencies, will assume the responsibility of preparing mothers for a successful delivery. After the baby is born she will continue to look after it and will place at the mother's disposal every known means of bringing it to strong and healthy childhood. The milk depot is the natural coordinating unit in all this work because of its proximity to the home. In the last analysis, infant mortality is to be solved, not by philanthropy or by institutions, or by the medical profession, or by the state, but by intelligent motherhood.

The assistance and supervision exercised over mothers from the period before confinement until the child is weaned should be as uniform as possible with respect to instruction given and methods taught. Probably some day the instructional work to prevent infant mortality, which at present is being paid for either by philanthropy or given gratuitously by physicians, will be taken over by our cities or towns. Already in New York City we have seen organized the Bureau of Child Hygiene, with the great corps of nurses working at least during the summer among the babies, and it is not unreasonable to expect this work in New York City and elsewhere to continue permanently throughout the year.

DISCUSSION

DR. L. T. ROYSTER, Norfolk, Va.: The educational features of the infants' milk depots represent the most important aspects of the work. We should teach mothers to modify the milk in their own homes. I favor the teaching of the essentials of infant hygiene and infant feeding in the elementary grades of the public schools.

DR. S. JOSEPHINE BAKER, New York: The Little Mothers' Leagues in New York City are voluntary organizations formed among the girls of 12 or over in the public schools in sections of the city where the older children have much of the care of their younger brothers and sisters. Meetings are held weekly, the doctor and nurse of the school serving as honorary president and vice-president. Children are given practical instruction in the preparation of food for infants; they are taught to modify milk, to bathe the baby, and other simple fundamental

rules of infant hygiene and home sanitation. Over 22,000 members are enrolled in the league.

DR. IRA WILE, New York: Two points should be emphasized in a consideration of milk depots. First, the possibilities of caring for the breast-fed baby for whom mixed feeding has to be resorted to when the mother is employed during the day. The breast-fed baby is more welcome than the one entirely artificially fed. Second, milk stations are for well children, not sick ones; they offer means of keeping babies well, not of curing them when they are ill. The third function of the milk station is to teach the ante-natal care of the breasts. Instruction should also be given in personal and household hygiene, and in dietetics. Classes for mothers are a potent means of reducing infant mortality.

DR. J. H. MASON KNOX, JR., Baltimore: The Maryland Association for Study and Prevention of Infant Mortality is a mother's relief society and milk depot combined. The association employs a physician to conduct classes for mothers, an obstetrician, a staff of trained nurses, and a social worker. The society is doing much toward combating the evils of the midwife problem.

MISS LYDIA HOLMAN, North Carolina: I am a visiting nurse in the mountains of North Carolina. The baby in the isolated communities has no chance, and my work was begun in order to secure more of a chance for mothers and babies in the mountainous districts. During eight years I have delivered 306 women. I hope that the plan for the extension of visiting nursing, with the possibilities it offers in the teaching of hygiene and home sanitation, will eventually reach every rural community in the United States.

(To be continued)

PHILADELPHIA COUNTY MEDICAL SOCIETY

Regular Meeting, held Nov. 9, 1910

The President, Dr. Henry Leffmann, in the Chair

TO WHAT EXTENT, IF AT ALL, SHALL THE PRACTITIONER REGARD INTESTINAL ANTISEPSIS AS FEASIBLE?

The Scientific Evidence of the Possibility of Influencing Bacterial Growth in the Intestines

DR. HORATIO C. WOOD, JR.: There is no disinfectant strong enough, in doses which would be safe, to destroy the viability of the bacteria in a quantity of fluid equal to that of the bowel. For such an effect it would require about an ounce of phenol or 5 grains of corrgoive sublimate. On the other hand, it is theoretically possible to exercise an antiseptic influence, that is, to restrain the development of bacteria. For this purpose, in a quantity of culture medium equal to the contents of the intestine, it would require: phenol, 3 drams; creosote, 30 minims; solution of formaldehyd, 13 minims; betanaphthol, about 9 grains. These figures do not take into consideration the possibility of the absorption. A critical examination of the experimental data as to the effect of chemical agents on the intestinal flora confirms this conclusion, and shows that it is at least within the bounds of hope to reduce the number of bacteria in the bowel with antiseptic agents. Present evidence shows that the official drug from which the most is to be expected is probably betanaphthol as it is the one in which the margin between safe dose and antiseptic power is the largest, with the exception of formaldehyd, and also that it is slowly absorbed and therefore likely to remain in the bowel long enough to do good.

Intestinal Antisepsis

DR. ALBERT E. ROUSSEL: The beginning of intestinal antisepsis may be traced back to 1872 when Selmi discovered in the products of putrefaction certain substances resembling alkaloids which he called ptomains. The phenomenon that the products of bacterial life are lessened after the administration of intestinal antiseptics indicates that their antiseptic effect is a matter of fact rather than of conjecture, since bacterial cultures do not tend to spontaneous cessation of growth even in so fertile a field as the intestinal tract. Either the intestinal antiseptics act by their own germicidal effect, or they stimulate the formation of organic substances that have the same effect. The contents of the intestinal tract have little effect in neutralizing the chemical antiseptics. A point of particular importance is not to confuse the medical conception of antisepsis with the surgical one of asepsis. Of my typhoid fever cases in the Howard Hospital by far the greater number have been treated with intestinal antiseptics. The mortality has been 4½ per cent.

Intestinal Antiseptics in Childhood

DR. ALFRED HAND, JR.: Strictly speaking, our aim should be not to retard the growth of microorganisms in the intestinal tract but to kill those germs that are causing trouble. In a consideration of the intestinal flora it is well to note the captions given by Moro that in health the intestinal flora depend on the kind of food taken by the infant, a diet rich in starch favoring the development of the fermenting saccharolytes, while food rich in albumin favors the growth of the putrefying proteolytes, and as Escherich pointed out, the possibility therefore exists of restraining intestinal putrefaction by giving starch plentifully; for fermentation and putrefaction cannot go on in the same medium. We must consider the patient first of all and do him no harm while ridding the intestine of the hostile germs. We should strive for the prevention of enteritis by avoiding the introduction of the disease producing germs. Clean milk is a necessity, and it is safer for at least nine months of the year in this climate to pasteurize the milk taken by infants and children. If the disease has gained a foothold, milk and all milk foods must be absolutely forbidden until the discharges have lost all evidences of inflammatory processes, and all remains of milk in the alimentary canal must be removed by purgation or colonic irrigation. The patient is now in the stage when the use of intestinal antiseptics may be considered. I regard thymol, the naphthol derivatives and phenyl salicylate, or salol, as too irritating. A comparison of two series of cases, one treated solely by the starvation plan, and one with bismuth salicylate, showed net results decidedly in favor of the drug. The drug seemed to have undoubted disinfectant properties which Steele's careful investigation proved mathematically. I would sound a word of warning in the use of calomel in these cases. The more I see of its use the more disinclined I am to employ it. To have any value, the bichlorid, into which it is converted, must be present in such amount as would seem to be irritant if not positively toxic.

Intestinal Antiseptics in Pregnant Women

DR. EDWARD P. DAVIS: Advanced pregnancy renders inevitable intestinal stasis from pressure. The result of this stasis is an effort on the part of Nature to protect the woman, and perforation may threaten. Constipation of pregnancy demands attention, and the pregnant woman must be considered as inevitably constipated. Our effort must be toward providing a diet which shall be poor in the materials tending to putrefaction. I have seen as much good result from the use of compound licorice powder as from any other remedy. Attention must also be paid to maintaining muscular tonicity. Personally, I should be unwilling to give any drugs in the doses recommended in the treatment of the pregnant woman because of the danger to the kidneys.

DISCUSSION

DR. J. P. CROZER GRIFFITH: I think it most important that we study the chemistry of foods, withdrawing that food which does the harm. The modification of the food is the important element both before and after the development of disease.

DR. JAMES W. WALK: My own feeling in regard to intestinal antisepsis is that we are not sure that any dose which is safe to use does a great deal of good, although there may be a possibility. Of great importance is the washing out of the intestine in a rational way. Generally the free use of water by the mouth is of advantage.

DR. HENRY LEFFMANN: In this connection the symbiotic relation of bacteria may well be considered. Bacteria in many cases act not singly but by combination.

State Boards of Registration

COMING EXAMINATIONS

ALABAMA: Montgomery, January 10. Chairman, Dr. W. H. Sanders, Montgomery.

ARIZONA: Phoenix, January 3-4. Sec., Dr. Ancil Martin.

COLORADO: Denver, January 3. Sec., Dr. S. D. Van Meter, 1723 Tremont Place, Denver.

DISTRICT OF COLUMBIA: The District Bldg., Washington, January 10. Sec., Dr. George C. Ober, 125 B St., S.-E.

ILLINOIS: Coliseum Annex, Chicago, January 11-13. Sec., Dr. J. A. Egan, Springfield.

INDIANA: 120 State House, Indianapolis, January 10-12. Sec., Dr. W. T. Gott.

MINNESOTA: State University, Minneapolis, January 3. Sec., Dr. W. S. Fullerton, 214 American National Bank Bldg., St. Paul.

NEW HAMPSHIRE: State House, Concord, January 3-4. Regent, Mr. Henry C. Morrison.

NEW MEXICO: Santa Fé, January 9-10. Sec., Dr. J. A. Massie.

NEW YORK: New York City, Albany, Syracuse and Buffalo, January 31 to February 3. Chief of Examinations Division, Mr. Charles F. Wheelock, Albany.

NORTH DAKOTA: Grand Forks, January 3-5. Sec., Dr. H. M. Wheeler.

OKLAHOMA: McAlester, January 3. Sec., Dr. Frank P. Davis, Enid.

OREGON: Portland, January 3. Sec., Dr. E. B. McDaniel, Electric Building.

RHODE ISLAND: State House, Providence, January 5. Sec., Dr. Gardner T. Swarts.

SOUTH DAKOTA: Aberdeen, January 11-12. Sec., Dr. F. W. Freyberg, Mitchell.

VERMONT: Montpelier, January 10-12. Sec., Dr. W. Scott Nay, Underhill.

VIRGINIA: Lynchburg, December 20-23. Sec., Dr. R. S. Martin, Stuart.

WASHINGTON: Spokane, January 3. Sec., Dr. F. P. Witter, 207 Traders' Block.

WISCONSIN: Milwaukee, January 10-12. Sec., Dr. John M. Beffel, 3200 Clybourn St.

Kentucky July Report

Dr. J. N. McCormack, Secretary of the Kentucky State Board of Health, reports the written examination held at Louisville, July 5-7, 1910. The number of subjects examined in was ten; percentage required to pass, 70, and not less than 60 in any one branch. The total number of candidates examined was 133, of whom 101 passed and thirty-two failed, including two osteopaths. The following colleges were represented:

College	Year Grad.	Total No. Examined.
PASSED		
Howard University, Washington, D. C.	(1890)	1
College of Medicine and Surgery, Chicago	(1910)	1
Univ. of Louisville (1903) (1908) (1909) 84	(1910)	87
Johns Hopkins University	(1905)	1
St. Louis University	(1910)	1
St. Louis Coll. of Phys. and Surg.	(1893)	1
Medical College of Ohio	(1903)	1
Eclectic Medical Institute, Cincinnati	(1907)	1
Ohio-Miami Medical College	(1910)	3
University of Tennessee	(1910)	2
Vanderbilt University	(1882) (1910)	2
FAILED		
College of Physicians and Surgeons, Chicago	(1910)	1
University of Louisville (1906)* (1909)† (15, 1910)		17
Louisville National Medical College	(1910)	1
Southwestern Homeopathic Medical College	(1910)	1
Kentucky School of Medicine	(1908)†	1
Louisville and Hospital Medical College (1908)* (1908)† (2, 1908)‡ (1908)**		5
Edwards Medical College††	(1889)	1
Meharry Medical College	(1908)* (2, 1910)	3

* Second examination.
† Third examination.
‡ Fourth examination.
** Fifth examination.
†† An official statement says that no college by this name was chartered in the State of New York.

Georgia Homeopathic October Report

Dr. R. E. Hinman, secretary of the Homeopathic Board of Medical Examiners of Georgia, reports that at the meeting held in Atlanta, October 3, 1910, two candidates were licensed through reciprocity. The following colleges were represented:

LICENSED THROUGH RECIPROCITY

College	Year Grad.	Reciprocity with
Hahnemann Med. College and Hospital, Chicago	(1900)	Indiana
New York Homeo. Medical College and Hospital	(1900)	New York

Idaho October Report

Dr. O. J. Allen, Secretary of the Idaho State Board of Medical Examiners, reports the written examination held at Boise, October 4-5, 1910. The number of subjects examined in was twelve; total number of questions asked, 110; percentage required to pass, 75. The total number of candidates examined was thirty-four, of whom twenty-three passed and eleven failed. The following colleges were represented:

College	Year Grad.	Per Cent.
PASSED		
Northwestern University Medical School (1907) 81; (1909) 80; (1907) 87; (1909) 75, 84		
Hahnemann Medical College and Hospital, Chicago	(1908)	84
Rush Medical College	(1907)	82
Chicago College of Medicine and Surgery	(1908)	77
College of Physicians and Surgeons, Chicago	(1908)	76
University of Louisville	(1910)	79
University of Iowa, Homeopathic College	(1910)	84
Baltimore Medical College	(1908)	83
University of Maryland	(1905)	76
Univ. of Minnesota, College of Med. and Surg.	(1908)	77
University of Minnesota, Homeopathic Dept.	(1907)	83
St. Louis University	(1905) 77; (1910)	79
University of Nebraska	(1903)	76
Medico-Chirurgical College, Philadelphia	(1910)	75
Jefferson Medical College	(1909)	83
University of Pennsylvania	(1907)	82
University of Nashville	(1902)	76
University of Toronto, Ontario	(1901)	76
FAILED		
Illinois Medical College	(1901)	68
College of Phys. and Surgs., Chicago	(1909) 72; (1910)	72
Chicago College of Medicine and Surgery	(1909)	63
State University of Iowa, Coll. of Med.	(1908) 64; (1910)	73
Sioux City College of Medicine	(1905)	70
Drake University	(1907)	70
Western Eclectic College of Medicine and Surgery	(1909)	73
University of Missouri	(1907)	71
Memphis Hospital Medical College	(1898)	22

The following questions were asked:

ANATOMY

1. Describe the most characteristic difference in the male and female skeletons. 2. Describe the levator ani muscle. 3. Give relations of important structures in axilla. 4. Rectus abdominis muscle—origin, insertion, sheath, description of muscle, actions. 5. Locate spleen, celiac axis, astragalus, liver outlines, Scarpa's triangle, incus, Haversian canals, parovarium, urachus, falx cerebri.

PATHOLOGY

1. Describe the process of infection, immunity, antitoxin, phagocytosis. 2. Describe the process of hyaline degeneration. 3. Describe the process of pigmentation; of putrefaction. 4. Describe suppurative inflammation; diphtheric inflammation. 5. Describe the structure of a sarcoma; name types of sarcomata. 6. Give pathologic lesions of lobar pneumonia and of capillary bronchitis. 7. Describe the structure of a carcinoma; name the principal varieties of carcinomata. 8. Describe the process of primary healing; of secondary healing. 9. Give the pathologic lesions of acute myelitis; of acute spinal meningitis, and acute anterior poliomyelitis. 10. Describe the lesions of chronic parenchymatous nephritis and chronic interstitial nephritis.

CHEMISTRY AND TOXICOLOGY

1. Mention four official lead preparations and give their chemical formulas. 2. Mention two sources of salicylic acid and describe the action and compound formed when combined with bicarbonate of soda. 3. Give Latin name, chemical formula and mode of preparation of yellow prussiate of potash. (b) Give process for making cyanid of potash. (c) What is red prussiate of potash? 4. Give symbols and atomic weight of (a) hydrogen, (b) oxygen, (c) silver, (d) lead. 5. Give full official title and chemical formula of tartar-emetic. 6. What is the source of phosphorus, (a) pilocarpin, (b) sarcolin, (c) with antidotes for the first two? 7. How many minims of Megendie's solution are necessary to represent ¼ grain of morphin? 8. What do you understand by corrosive poison? How soon after the poison is taken will symptoms follow? 9. Explain the action of potassium permanganate and tannic acid as an antidote for opium. 10. What is the difference between sulphids, sulphites and sulphates?

PHYSIOLOGY

1. What effect is produced on the heart's action by stimulation of the cardio-inhibitory center? By stimulation of the pneumogastric nerve? 2. Describe the glands and villi of the intestines. 3. Describe the digestion of a meal of beefsteak and potatoes. 4. Describe the process of absorption by the blood-vessels and by the lymphatics. 5. What is the effect of an excessive meat diet? 6. Name eight secretions and describe the functions of each. 7. Define metabolism, anabolism, catabolism. What are the objects of metabolism? 8. What are the functions of the pneumogastric nerve? 9. Describe the seminal fluid. Through what structures does it pass? 10. What are the sources of animal heat? How is normal body temperature regulated?

HISTOLOGY

1. Mention methods of cell-division, giving examples. 2. From what primary layer is the kidney developed? nails? bone? muscle? epithelium of bladder? 3. Mention three varieties of cartilage and give example of each. 4. Describe the structure of the uterus. 5. Mention five ductless glands.

HYGIENE

1. Admitting that personal infection is the chief means by which diphtheria is carried from place to place, what meteorologic conditions have invariably preceded the most extensive epidemics of that disease? 2. How much linear wall space and how much air space per bed should be available in a ward for contagious diseases? How often should the air be changed? 3. What is meant by the "propulsion" or "plenum" method of ventilation for hospitals, and what are its good and bad points? 4. How high a temperature is required to expel the alcohol from yeast bread? (a) What is the temperature of the baker's oven? (b) Is the loaf effectually sterilized in the baking? 5. What effect has the temperate use of alcoholic spirits on the general health? (a) So used, what is the principal source of elimination? 6. What benefits are derived from the use of tea and coffee and how should these beverages be prepared to obtain healthful results? 7. What are the anticorbutic properties of potatoes? 8. In changing from extremes of heat to cold, or the reverse, how does the body conserve its forces? 9. What has been the influence of sewage irrigation, or farming, on the general health of those living on the land or engaged in the work? 10. Name the principal methods for the disposal of excreta and sewage.

OBSTETRICS

1. Give the names of the bones which constitute the pelvis and give the diameters at the superior strait. 2. Give the diagnostic signs of pregnancy. 3. Give the etiology, symptomatology and treatment of puerperal eclampsia. 4. Describe the treatment for adherent placenta. 5. Give the diagnosis and treatment for placenta prævia. 6. Give the indications for the induction of abortion. 7. Describe the mechanism of an L. O. A. presentation. 8. Describe the treatment for puerperal infection. 9. Give the diagnostic points of an extrauterine pregnancy. 10. Give the etiology, symptomatology and treatment of mammary abscess.

GYNECOLOGY

1. Give the symptoms, objective and subjective, of uterine anteversion and retroversion. 2. Give definition, pathologic changes, causes and symptoms of senile endometritis. 3. Classify uterine fibroids as to location and differentiate between a submucous and interstitial one. 4. Tabulate points of difference between chancre and chancroid on the external genitals of the female. 5. Name the different situations in which hernia of the ovary has been found, and state when palliative treatment is indicated and when radical treatment. 6. Give the indications, action and technic for the intrauterine douche. 7. Tabulate diagnostic points between an inverted uterus and a uterine polypus. 8. Tabulate clinical history (only) of ascites and ovarian cyst. 9. Define subinvolution of the uterus and describe the pathologic changes which are coexistent in the pelvic organs. 10. What are the indications for treatment in case of gonorrheal infection of the endometrium?

DIAGNOSIS

1. Describe the temperature curve and give the diagnostic points in a typical case of typhoid fever. 2. Describe a test for the demonstration of the *Bacillus tuberculosis*. 3. Give the symptoms and physical signs of a right-sided lobar pneumonia. 4. Differentiate between rheumatic fever, pyemia with suppurative arthritis and gonorrheal arthritis. 5. Differentiate between carcinoma of the stomach and gastric ulcer. 6. Give the symptomatology and diagnosis of exophthalmic goiter. 7. Describe the symptoms of rachitis. 8. Describe the urinary findings in diabetes mellitus and chronic interstitial nephritis. 9. Differentiate between the comas of apoplexy, hysteria, alcoholism and uræmia. 10. Differentiate between measles and scarlet fever.

PRACTICE OF MEDICINE

1. Give the etiology and symptoms of obstruction of the ductus communis choledochus. 2. Give the etiology and symptoms of diabetes insipidus. 3. Give the etiology and symptoms of peptic ulcer of the stomach. What special symptoms would suggest ulcer of the duodenum? 4. Describe a pancreatic cyst. Give the symptoms of acute pancreatitis. 5. Give the etiology, leukocyte symptoms and prognosis of Addison's disease. 6. What is the etiology of cretinism, its lesions, symptoms and prognosis? 7. Give the causes, lesions and symptoms of perinephritic abscess. 8. What are the symptoms of acute anterior poliomyelitis? 9. Give the cause of hemophilia. How may the source of the blood be inferred? 10. Describe the symptoms and course of pseudoleukemia.

SURGERY

1. Inflammation—definition, classification, symptoms, pathology, terminations. 2. Mention five conditions caused by disturbances of nutrition. 3. What tissue is most dependable in closing openings in abdominal hernias? 4. What is acromegaly? Opsonin? Phagocytosis? Dermoid? Anaphylaxis? 5. Severe crushing injury of foot. Expectant treatment? Indication for amputation? Give technic of any classical amputation of foot. 6. Carcinoma of the breast. Give diagnosis and technic of operation. 7. Give diagnosis and treatment of tuberculous disease of the hip-joint. 8. Give technic of gastro-enterostomy. 9. What is the Fowler position? Bier treatment? Pott's disease? Wassermann reaction? Murphy method of proctoclysis? 10. Differentiate cholelithiasis.

MATERIA MEDICA AND THERAPEUTICS

1. What is an alkaloid? A glucosid? A resin? A gum? 2. What is the active principle of nux vomica? Mandrake? Aloes? Jaborandi? Belladonna? Give dose of each? 3. Senna: Mention the several varieties. Where is it found? What part of the plant is used? What are its medicinal properties? 4. What is the alkaloidal strength of gum opium? Of cinchona bark? 5. What is the common name of staphisagria? What are its therapeutic uses? 6. Give the physiologic action of ergot and name the conditions that indicate its use in labor, and the contra-indications? 7. What are the advantages in the use of chloroform as an anesthetic, and what are the signs indicative of danger in the patient? 8. Explain how antitoxin causes immunity and effects a cure, and the methods of administration as a prophylactic and curative agent. 9. What is cumulative action? Name one drug that has this tendency and give symptoms of such action. Explain the constipating action of opium.

Book Notices

INNERE SEKRETION. Ihre physiologischen Grundlagen und ihre Bedeutung für die Pathologie. Von Dr. Artur Biedl, Wien. Mit einem Vorwort von Dr. R. Paltauf, Wien. Cloth. Price, $5.50. Pp. 538. Berlin: Urban and Schwarzenberg; Rebman Co., New York American Agents, 1910.

In this valuable book the author aims to give and gives with complete success, a connected, comprehensive, well-considered and critical presentation of our knowledge of internal secretions.

In a short general part there is traced briefly the development of the ideas of neural and humoral correlation of organs up to the definite establishment by Claude Bernard and Brown-Séquard of the conception of internal secretions. This conception is then defined and its limits drawn, the origin and modes of action of hormones outlined, and the methods and materials used by investigators in developing our knowledge of internal secretions detailed.

In the special part, which constitutes the bulk of the book, the author takes up the thyroid apparatus, the thymus, the adrenal systems, the hypophysis, the pineal gland, the internal secretions of the reproductive organs, of the pancreas, the gastric and the intestinal mucous membranes, and of the kidneys.

In the case of the ductless glands, the development, the human and comparative anatomy, the physiology and physiological chemistry, the pathology, spontaneous as well as experimental, the effects of removal, and the therapeutic relations are fully considered. In each case the development of the knowledge is set forth in an interesting manner. In connection with the adrenals the presentation of the complex embryology and anatomy and of the mode and range of action of adrenalin is furthered materially by means of tabular summaries. The author, himself an active investigator in the fields in question, commands all divisions of the very extensive literature completely. The discussions of moot questions are marked by keen judgment; the difficulties in the way of final opinions are fully stated; and the author carefully avoids further complications by the introduction and advocacy of unnecessary hypotheses. The bibliography, which is not claimed to be complete in any sense, covers 180 pages, and it may be said that it covers the most important literature very well.

There are no illustrations and as the title indicates no attempt is made to discuss from the practical point of view the clinical course, the diagnosis or the treatment of diseases due to disturbances of internal secretions.

Biedl's book will be of great help to students and investigators and is a welcome addition to our literature.

Professor Paltauf writes an interesting preface.

CHILDREN'S DIET IN HOME AND SCHOOL. With Classified Recipes and Menus. A Reference Book for Parents, Nurses, Teachers, Women's Clubs and Physicians. By Louise E. Hogan, Editor of "The Children's Library." Cloth. Price, 75 cents net. Pp. 128. New York: Doubleday, Page & Co., 1910.

This attractive appearing little volume is one of a type that is unfortunately not rare and which, therefore, deserves more comment than it would in itself warrant. The author of this "reference book for parents, nurses, teachers, women's clubs and physicians" is a lay woman who is also editor of "The Children's Library" and author of "Stories for Children," "How to Feed Children," "The Education and Amusement of Children," etc. A number of pages of this book are devoted to infant-feeding and these best illustrate the point here emphasized. This field that the pediatrician of wide experience and profound training goes into with fear and uncertainty, the author enters as calmly as if she were telling a fairy tale to a child. Only a direct quotation can fully convey this ingenuousness. We are told: "Milk prepared with Fairchild's peptogenic milk powder may be used as a substitute without fear during the whole period of early bottle feeding and weaning. An actual study was made by Fairchild of cow's milk and of human milk, and by certain definite stated methods the former was brought to closely resemble human milk. Certainly science need go no further in its search for a suitable food for an infant deprived of its natural supply than to provide a substitute which is recognized as

ole resembling nature by those who are supposed to know, hence mothers who wish to follow Nature's laws have here an opportunity to do so. A useful little 'red-letter' circular of four pages gives in a brief form all the directions necessary in both ordinary and unusual cases."

How simple, and withal how comprehensive! The science and art of infant-feeding, normal and abnormal, that has been the storm center of pediatric discussion for decades, reduced to four "red-letter" pages advertising a patented baby food! The strange thing is not that the author believes all this, for she has evidently read certain advertisements very carefully and they read convincingly; but that an intelligent layman should know so little about infant-feeding as to undertake to write about it in a book for physicians, or, for that matter, for parents. Further comment would be unkind, for the author is evidently earnest and sincere. Only a sense of duty has prompted the foregoing comments. Such books are distinctly pernicious, because to the uninitiated they bear the stamp of authority.

A MANUAL OF CHEMISTRY. Theoretical and Practical, Inorganic and Organic. Adapted to the Requirements of Students of Medicine. By Arthur P. Luff, M.D., Physician to St. Mary's Hospital, and Hugh C. H. Candy, B.A., Lecturer on Chemistry in the London Hospital Medical College. Cloth. Price, $1.75. Pp. 622, with 46 illustrations. Chicago: Chicago Medical Book Co., 1910.

This is a complete manual of chemistry for medical students in a small, compact and convenient volume. The book covers the usual ground gone over in medical colleges and in addition material intended for such students as may expect to take examinations requiring knowledge regarding the testing of compounds. This is especially noticeable in Part II, in which the technic for gas analysis is given, which is required in some examinations in England, but which in this country is entirely unnecessary. The work also goes further in physical chemistry than usual. The book may be considered very complete as a regular text for college students but appears to go into details which are unpractical for medical students.

MENTALLY DEFICIENT CHILDREN: THEIR TREATMENT AND TRAINING. By G. E. Shuttleworth, B.A., M.D., Medical Examiner of Defective Children to the Wilesden Education Committee, and formerly to the School Board for London, etc., and W. A. Potts, B.A., M.D., Consulting Medical Officer, National Association for the Feeble-Minded, etc. Cloth. Price, $2 net. Pp. 236, with illustrations. Philadelphia: P. Blakiston's Son & Co., 1910.

The book devotes little space to pathology, but enters fully into the clinical features of mental deficiency, beginning with an interesting historical summary of the treatment of defective children. The authors lay greatest stress on the treatment, mental, moral, and especially industrial; etiology, classification, and prognosis are treated at length. The book can be commended to the physician as a broad, sympathetic and thorough discussion of this important subject.

THE REFRACTIVE AND MOTOR MECHANISM OF THE EYE. By William N. Souter, M.D., Associate Ophthalmologist, Episcopal Eye, Ear and Throat Hospital, Washington, D. C. Cloth. Price, $2. Pp. 347, with 148 illustrations. Philadelphia: The Keystone Publishing Co., 1910.

The author gives a commendable exposition of the mechanics and physics of optics, and of the refractive and motor mechanism of the eye with reference to the correction of its visual defects by lenses and nerve-tract and muscle exercises. Though elementary in character, the book gives a sufficiently full and clear explanation to aid the student or physician in acquiring a practical knowledge of the subject. An appendix contains algebraic formulas to elucidate the various optical problems. The book is well illustrated.

TREATISE ON DISEASES OF THE SKIN. For the Use of Advanced Students and Practitioners. By Henry W. Stelwagon, M.D., Professor of Dermatology in the Jefferson Medical College, Phila. Sixth Edition. Cloth. Price, $6 net. Pp. 1195, with 323 illustrations. Philadelphia: W. B. Saunders Co., 1910.

This work in its various editions has received such wide approval from the profession that it has become one of the standard works on diseases of the skin. No further word is needed in regard to it than to say that in this edition it has been revised and many new subjects, new treatments and new illustrations included. As reflected in new editions in other branches of medicine, the increased interest in tropical diseases in recent years has brought forth a number of new skin affections, which are described for the first time.

INDEX-CATALOGUE OF THE LIBRARY OF THE SURGEON-GENERAL'S OFFICE, UNITED STATES ARMY. Authors and Subjects. Second Series. Vol. XV. S.—Skin Grafting. Cloth. Pp. 777. Washington: Government Printing Office, 1910.

The fifteenth volume of the second series of this index-catalogue contains 8,804 author titles, representing 4,688 volumes and 7,460 pamphlets, together with 3,616 subject-titles of separate books and pamphlets and 28,328 titles of articles in periodicals.

Medicolegal

Admissible Opinion Evidence Where Insanity is the Defense to Crime

The Supreme Court of Oregon holds, in the homicide case of State vs. Roselair (109 Pac. R. 865), where the special defense was insanity, that it was not error to permit a medical expert, who made a personal examination of the defendant two or three days after the homicide, and observed his mental condition, to answer the question, propounded by the district attorney: "What would you say as to whether or not he knew right from wrong, and appreciated the consequences of his acts and the nature and quality of his acts?"

The court says that the line of demarcation between sanity and insanity is so indistinct, in some instances, that it is difficult even for a physician to determine them accurately. It is also perplexing for a medical expert to explain the extent of mental infirmity, or to elucidate the degree of intellectual strength so that a person unacquainted therewith may gain a correct idea of the capacity or responsibility of a person whose particular act is the subject of judicial inquiry. In order, therefore, to adapt the language of a witness to the understanding of men of ordinary intelligence, courts have permitted answers to be given which would seem almost to trench on the issue that the jury were called on to determine. It must be admitted that a conflict of judicial utterance exists in respect to this manner of proving a relevant fact. But this court believes that the rule adverted to, though founded in necessity, is fortified by reason and supported by authority. Thus, inquiries calling for opinions respecting the capability of a person charged with the commission of a crime, to distinguish between right and wrong, have been permitted to be answered by witnesses called for that purpose.

The rule is well settled that a medical expert who has made a personal examination of another, for the purpose of determining his capacity to execute a contract, or his responsibility for the commission of a crime, may express an opinion as to the mental condition of such a person at the time of the investigation. A qualified physician may also be allowed by a court to assert an opinion from an examination made of a defendant subsequent to the commission of a crime as to whether or not the person accused thereof was sane or insane at the time the offense was perpetrated. In cases of derangement, the indications of the infirmity frequently manifest themselves for some time after the paroxysm of dementia, and for this reason evidence of recurring symptoms is admissible after the commission of an act asserted to have been perpetrated while laboring under a state of mental exaltation or depression. From such testimony the jury are authorized to deduce an inference as to whether or not the act in question resulted from a mind that was disordered.

Contract with City Health Officer for Services in Epidemic Held Invalid

The Supreme Court of Minnesota holds that a demurrer was properly sustained to the complaint in the case of Bjelland vs. City of Mankato (127 N. W. R. 397), which was brought by the plaintiff, who was health officer of the city, to recover $1,695 for necessary services rendered in connection with eradicating and controlling an epidemic of small-pox and typhoid fever in the city in 1908, pursuant to an alleged contract with the board of health of the city. The court says that it found it necessary to consider only the question of the validity of the contract which was the basis of the plaintiff's claim. The complaint showed that he was a member of the board of

health—that is, a public officer—and that he entered into the contract with such board for the performance of the professional services for the value of which he sought to recover in this action. Such contracts are forbidden by section 5,032 of the Revised Laws of Minnesota of 1905, and are void. The rule that such contracts are void and cannot be enforced rests on a wise public policy, and it must be enforced without reference to the merits of the contract, the intention of the parties, or the hardship of exceptional cases. Nor does the court agree with the contention that the statute and the rule do not apply to a board of health, and that it may employ one of its members its health officer for the purpose of controlling and suppressing an epidemic of contagious or infectious disease. As to the suggestion that the board of health was confronted by an emergency which justified it in making the contract in question, the court answers that an emergency confronts a board of health in every case of an epidemic of contagious or infectious disease; but this affords no reason why such cases should be excepted from the statute by the court, for the board may employ, when the emergency justifies it, a physician other than one of their own number to render the extra medical services.

Treatment for Rheumatism Instead of Periostitis or Osteomyelitis

The Supreme Court of Alabama affirms a judgment for the defendant in the malpractice case of Hamrick vs. Shipp (52 So. R. 932). It says that the plaintiff's son had been thrown by a mule. Some days afterward the condition developed which made it necessary to procure medical attention. The defendant treated him for acute articular rheumatism. Other physicians of good reputation concurred in his diagnosis and treatment. There was testimony, however, which went to show that the boy's trouble was periostitis or osteomyelitis. But the question put to the jury by the pleading was whether the defendant had "conducted himself in an ignorant, unskillful or negligent manner" in and about his treatment of the boy, and the trial judge instructed the jury, on the defendant's request, that the question for their determination was not whether the boy had periostitis, osteomyelitis or rheumatism, but whether the defendant was possessed of reasonable skill, and whether he had been reasonably diligent, not negligent, in diagnosing and treating the case. There was no reversible error in giving the instruction. It was perhaps not so carefully limited on all sides as it might have been, for it seemed capable of the interpretation that it was not for the jury to determine the nature of the boy's ailment for any purpose, whereas, if the jury could have decided that question, that decision would have been of consequence in determining the ultimate question proposed by the pleading. But there is no rule of responsibility which requires the physician to be infallible in the diagnosis or treatment of diseases. The fact, therefore, if it was a fact, that the disease was something other than rheumatism, was evidential merely, not conclusive. The instruction given correctly stated the ultimate question to be submitted to the jury for decision. If the plaintiff apprehended prejudice from lack of further statement, he should have supplied that element by an explanatory instruction.

Wrongful Attempt to Discredit Physician as Witness

The Springfield (Mo.) Court of Appeals says that in the personal injury case of Dent vs. Springfield Traction Co. (129 S. W. R. 1044) counsel for the plaintiff said in his opening statement that one Dr. R. would not be called as a witness because he was the physician for an employe of the defendant; he having attended the plaintiff as a physician when she was first injured. It was, perhaps, the privilege of the plaintiff not to call her physician as a witness; but the remarks discrediting him beforehand may have been prejudicial to the defendant. Such a statement, under the circumstances, justified the application of the defendant for the appointment of a physician by the court to make a physical examination as to the extent of the plaintiff's injuries. Especially might this be considered true because the defendant could not use Dr. R. as a witness—he being privileged—should the plaintiff object to his testimony. And it may be considered one thing to waive your own privilege and quite a different proposition to make a statement to the jury implying that you are constrained to do so by reason of some act or conduct imputable to the opposite party.

But when the trial court showed its willingness to have a physician appointed in this case to make the examination the defendant sought to name the physician, suggesting one of its own employes, and afterward named another physician. The court however refused to appoint either of those named; but, without suggestion from either party, named a certain Dr. S., a reputable physician and surgeon, to make the examination. No objection to his qualifications were made by the defendant at any time, and no bias or prejudice was claimed, the only objection being a mere statement of the defendant's counsel that the personal relations between Dr. S. and himself were not pleasant. This certainly was not a sufficient disqualification to prevent the physician from making a correct examination and properly discharging his professional duty, and the objection to the action of the court is held wholly unsubstantial.

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

Medical Record, New York

December 3

1 *Case of Sulphemoglobinemia. T. W. Clarke, Utica, N. Y., and R. M. Curtis, Paterson, N. J.
2 Chemical Problems in Diabetes. A. Magnus-Levy, Germany.
3 Occupation as a Therapeutic Agent in Insanity. M. D. Neff, Brooklyn.
4 Ventilation of Cars. W. A. Evans, Chicago.
5 Diagnosis and treatment of Osteal Tuberculosis without Abscess Formation. B. Holmes.
6 Treatment of the More Common Diseases of the Skin. E. L. Cocks, New York.

1. **Sulphemoglobinemia.**—To the seven cases of this disease now recorded in the literature, Clarke and Curtis add another. The patient, a woman 24 years of age, had never been robust, having suffered from most of the ills to which woman is heir. A few days previously she had noticed that her lips had become blue and her color ashen, though she herself did not feel ill. She was somewhat weak and markedly constipated. Her appearance at that time was much as it is to-day. Her skin was of a steel blue, and her lips purple black. The general appearance has been described as being cadaveric, or better as of the ghastly hue seen in a person standing under the Cooper-Hewitt mercury light. Physical examination was, however, negative except for the remarkable discoloration of the entire body. The heart and lungs were practically normal. The patient was observed for some weeks, and as the ordinary blood examination failed to reveal any polycythemia or other abnormality to account for the condition, a tentative diagnosis of sulphemoglobinemia was made. Two cubic centimeters of blood were withdrawn from a vein in the arm. The blood, which was of a rich chocolate color, was shaken with twice its volume of distilled water in order to lake the corpuscles, and then filtered several times to remove all of the corpuscular remains and fibrin, and give a clear solution. This solution then being further diluted with distilled water was examined with a small pocket spectroscope and showed an intensely dark absorption band in the red portion of the spectrum, in the situation characteristic of the band of sulphemoglobin. Artificial solutions of sulphemoglobin made by the passing of sulphuretted hydrogen through laked and diluted dog's blood and of methemoglobin by adding potassium ferricyanid or sodium nitrate to similar blood were made for comparison.

The methemoglobin solution when mixed with oxyhemoglobin showed the two absorption bands of oxyhemoglobin in the yellow and green portions of the spectrum, and the characteristic methemoglobin band deep in the red much nearer the C than the D line. The artificial sulphemoglobin showed

also the bands in the yellow and green, and a band in the red, but not so far in the red as in the methemoglobin spectrum, the band being midway between the C and D lines. The patient's blood in a concentrated form showed complete obliteration of the oxyhemoglobin bands, and the presence of an exceptionally clearly defined band half way between C and D absolutely indistinguishable from that of the artificially made sulphemoglobin.

From the evidence at hand, the authors conclude that this is an undoubted case of sulphemoglobinemia of idiopathic origin.

New York Medical Journal

December 3

7 *Iodin. F. T. Woodbury, Fort Assiniboine, Mont.
8 Regulation of Prostitution. F. Bierhoff, New York.
9 Hyperemphroma. I. W. Blackburn, Washington, D. C.
10 Operative Treatment of Cysto-Urethroscopy. L. Buerger, New York.
11 Case of Hyperemphroma. J. A. Jackson, Indianapolis.
12 Carbon Compounds of Arsenic in the Treatment of Syphilis. S. C. Runnels, Indianapolis.
13 Centenarians. J. Knott, Dublin.
14 Treatment of Diabetes Mellitus. H. C. Sawyer, San Francisco.
15 Cholelithiasis. C. M. Stimson, Philadelphia.
16 Cocain Intoxication. N. S. Yawger, Philadelphia.

7. **Iodin.**—In Woodbury's opinion iodin is the long desired ideal disinfectant and antiseptic. It is cheap, easily obtainable, can be carried in small bulk, is efficient in high dilution, does not damage tissue even where its vitality has been much reduced by traumatism or infection, it has been invariably successful as a germicide under all conditions when the drug and the germs have been brought together, and though it has great powers of tissue penetration the writer has yet to see a case of poisoning even when it was mopped in full strength on the peritoneum and in the parturient uterus. It can be used to disinfect the area of operation without previous preparation; to sterilize instruments, suture material, dressings, and the hands of the surgeon, during the time that the patient is going under the anesthetic. Woodbury prefers to boil his instruments when he can, as the continued use of iodin tarnishes and affects the cutting edges requiring whetting often, though the same in a lesser degree may be said for the soda solution. He uses it entirely to prepare his hands and finds it rarely causes irritation. It can be removed from the hands by boiled or raw starch, ammonia water or the aromatic spirit of ammonia, hydrogen peroxid, Fowler's solution, or ether. It is advisable where long periods of operating are expected, to dip the hands in iodin and immediately decolorize with ammonia; rubber finger cots or rubber gloves may be slipped on, and then redipped in the iodin. This is merely to protect the operator's hands from being dyed a deep brown, which is almost impossible to get rid of, especially when the tincture is reapplied every one or two days.

The solution of one teaspoonful of the tincture to the quart of physiologic salt solution is, roughly, a dilution of seven milligrams in one hundred cubic centimeters, or .007 per cent., and in this strength is most efficacious as an irrigation in all inflammatory and catarrhal conditions of mucous membrane. It can be used in the eye for the ordinary forms of conjunctivitis with prompt improvement. He has also found it to be very efficacious in acute urethral gonorrhea in twice and three times this strength. When a case of mumps developed in a company of infantry this solution was supplied to the company to be used copiously as a gargle for several days. No other case of mumps developed. It is a routine treatment for all acute throat affections, and in cases of amygdalitis the tonsils are also mopped once daily with the tincture and Bier's treatment with a rubber bandage around the throat has cut down the illness to an average of five days on sick report. It will promptly abort colds when used as a spray. Woodbury has found the iodin salt solution is excellent in cystitis acute and chronic, and catheters kept in the tincture and then transferred to this solution just before use are sterile, non-irritant and perfectly pliable.

The troublesome cases of chancroids with suppurative inguinal adenitis which drag along in hospital for so many weeks are now rapidly hurried to convalescence by a vigorous pursuit with the tincture. Buboes which have already broken down promptly become healthy granulating wounds and heal up without further trouble.

Boston Medical and Surgical Journal

December 1

17 Doctrine of Vitalism in Medicine. M. G. Seelig, St. Louis.
18 Present Knowledge of the Laws of Heredity. W. P. Graves, Boston.
19 Postoperative Psychoses. J. G. Mumford, Boston.
20 Myxo-Fibrosarcoma Originating in the Great Omentum. H. Cabot, Boston.

Archives of Diagnosis, New York

October

21 *Pharmaco-Diagnosis of Cardiac Diseases. A. Abrams, San Francisco.
22 *The New Functional Psychiatry. W. A. White, Washington, D. C.
23 *Adventitious Murmurs Accompanying the First Heart Sound. A. L. Benedict, Buffalo, N. Y.
24 Importance of the Neck and Chest Muscles in the Production of the Phenomena Obtained by Percussion and Auscultation of the Chest. F. M. Pottenger, Monrovia, Cal.
25 Diagnosis of Chronic Duodenal Catarrh. M. Einhorn, New York.
26 Diagnostic Significance of the Acute Headaches of Children. L. Kerr, Brooklyn, N. Y.
27 Gastro-Intestinal Hemorrhage in Children. L. Fischer, New York.
28 Diagnostic Difficulties in Reconciling the Pathologic Findings with the Clinical Manifestations in an Unusual Case of Cerebral Softening. A. Gordon, Philadelphia.
29 Differential Diagnosis Between Gonorrheal Epididymitis and Syphilitic Orchitis. A. Ravogli, Cincinnati.
30 Diagnosis of Stricture of the Male Urethra. V. C. Pedersen, New York.

21. Cardiac Diseases.—Succinct reference is made by Abrams to the employment of drugs in the diagnosis of some affections of the heart.

Heart Reflex: The reflex in question is a contraction of the myocardium of varying duration when the skin of the precordial region is irritated. This reflex may also be discharged by irritation of the mucous membranes, psychic influences and percussion of the muscles, but the most effective method of provoking it is by means of concussion of the spine of the seventh cervical vertebra. Atropin paralyzes the motor endings of the vagus. During the full physiologic action of the drug the heart reflex is abolished. Small doses of pilocarpin are antagonistic in their action to atropin. After an hypodermic injection of pilocarpin (gr. 1/10), one notes an exaggeration of the heart reflex.

Adams-Stokes Syndrome: Heart-block is caused by lesions of the auriculo-ventricular bundle, and there are also neurogenic forms of the disease due to overstimulation of the vagus. The use of atropin removes the block in the neurogenic forms, whereas in the myogenic forms the heart-block is unaffected. Partial heart-block may be provoked by the inordinate use of digitalis.

Tachycardia: Aconite (tincture is most reliable) slows the heart by vagus stimulation and has only a slight action on the myocardium. If aconite slows the pulse in tachycardia, diminished tonic activity of the vagi may be assumed to exist. If atropin is used between the attacks of paroxysmal tachycardia, and no attack ensues, one may conclude that paralysis of the vagi is not responsible for the paroxysms. In tachycardia from vagus paralysis, the heart does not respond to digitalis because the latter ordinarily inhibits the rapidity of cardiac action by stimulation of the vagi. Here strophanthus is more effective, because it slows the heart by direct action and not by vagus stimulation.

Arhythmia: Vagus stimulation not only slows the heart-rate, but may also create irregularities in rhythm. If this vagus influence is eliminated by atropin, the irregularities will disappear and thus the neurogenic nature of the irregularity is demonstrated. Irritation of the mucosa of the nasal septum opposite the middle turbinate bone will evoke an arhythmia of vagal genesis. Here the irritation is conveyed indirectly to the vagus by the trigeminus. If the nasal mucous membrane has been cocainized, irritation of the mucosa by means of a probe will not evoke arhythmia. Cocainizing first one and then the other side of the nose, the source of irritation may be localized and by correcting the nasal anomaly the arhythmia may be cured.

Myocardial Diseases: Myocardial disease may be suspected even in the absence of cardiac signs, when symptoms not unlike those which accompany the broken compensation of valvular diseases present themselves. A reliable preparation of digitalis may solve the difficulty; if, after five days, the

symptoms are not relieved and there is no rise of the peripheral arterial tension nor increased strength of the pulse, the drug can do no good and may even be dangerous. Within thirty-six hours after the use of a reliable preparation given in adequate doses, one finds that the pulse becomes stronger, more regular and slightly decreased in frequency (provided the pulse was accelerated before the use of digitalis) and diuresis is augmented. By estimating the quantity of urine excreted one is afforded a guide in a dual direction: the reliability of the drug and the efficiency of the cardiac muscle. In cardiac muscular insufficiency, the quantity of urine may be diminished by one-half or more. Owing to the delayed action of digitalis, an increase in the quantity of urine does not occur until the second day of its use; then it continues to increase day after day until the normal is attained (1,500 c.c. in twenty-four hours in a healthy adult); at this time, and when the pulse frequency has been reduced and the tension is increased, one should withdraw the drug, reduce the dose, or give it less frequently.

Cardiac Asthma: Dyspnea resembling this affection may be excited by irritation of the nasal mucosa, and here cocain applied to the latter by arresting the attack establishes the diagnosis. In differentiating cardiac from bronchial asthma, the former may be prevented by cardiotonic medication, whereas bronchial asthma is uninfluenced unless a dilated right ventricle complicates the disease. Acute failure of the ventricles is commonly present in cardiac asthma, and the attack may be at once jugulated by concussion of the seventh cervical spine. Râles are usually absent in cardiac asthma unless complicated by lung edema. Amyl nitrite inhalation causes the râles due to bronchial spasm to disappear and is without influence on the râles caused by mucus or fluid in the bronchial tree.

Ventricular Dilatation: In differentiating this condition from a pericardial exudate, the heart reflex is invaluable. If the area of precordial dulness is modified after cutaneous irritation, cardiectasis and not an exudate is present.

Angina Pectoris: The pains of false angina are at once subdued by sufficiently large doses of antipyrin, whereas in true angina there is no relief; in fact, the pains may be accentuated, owing to the internal vasoconstriction of the drug.

Thyroid Heart: The physiologic tonus of the vagus is said to be dependent on the thyroid secretion. In diminution of the latter (hypothyroidism), symptoms of cardiac weakness are present. Disturbances due to hyperthyroidism are not common. In hypothyroidism (Basedow's disease), antithyroidin or the antiserum of Beebe may improve the condition. It is well to know that the cardiac signs of the latter condition are accentuated by ten 5-grain doses of a reliable thyroid preparation. Iodothyrin or iodin will act in the same way and intolerance to iodin is an early sign of hyperthyroidism. A biochemic evidence of the latter is the antagonism existing between thyroid extract and epinephrin in the pupillo-dilator action of the latter on the eye of the frog. In the normal epinephrin does not dilate the pupil, but this occurs after extirpation of the pancreas, in pancreatic insufficiency, diabetes and Basedow's disease. The foregoing susceptibility is most probably caused by hyperthyroidism.

Cardiac Murmurs: Cardiomuscular murmurs dependent on the delirious condition of the organ disappear after the use of digitalis. The latter drug also causes the disappearance of the murmurs of a relative valvular insufficiency. The loudness of a murmur is largely dependent on the activity of the heart. Faint murmurs may often be converted into loud ones by increasing cardiac activity and the latter may be attained by digitalis. Anemic cardiac murmurs disappear after the use of an appropriate chalybeate, but it must completely disappear before we are justified in concluding that it is hemic, insomuch as anemia may coexist with an organic murmur.

22. **Functional Psychiatry.**—The keynote of what White terms the new functional psychiatry is its distinctly individualistic trend, its emphasis of the importance of individual psychology. The new movement emphasizes so much more the necessity of the analysis of the symptoms in the individual case that in spite of the work of the Kraepelin school in this direction, White thinks it proper to designate individual psychology as the characteristic of the new movement in contrast to the life history conception underlying the Kraepelinian. The fundamental conception of this new individualistic viewpoint is that every psychic fact must have been preceded by an efficient psychic cause. Ideas, or better, mental states, do not arise *de novo*. They must be the outcome always of other mental states from which they necessarily issue. This is true throughout the world of psycho-pathology, even in the realm of the so-called organic—the psychoses associated with well-defined brain changes. That an alcoholic should have delirium may well be dependent on a toxemia, but whether he sees in his delirium snakes or monkeys, visions of his office or of hell, must depend on purely psychic causes, on the pre-existing psychic material which has become involved in the disorder. Whether a paretic is exalted or depressed, whether the exaltation is largely erotic or expresses itself by delusions of great wealth must find its explanation in the mental make-up of the person afflicted, and the character of his psychic trends. The fact intended to be emphasized is that the disease process can only deal with the material it finds at hand or which is furnished it, and which it does not itself create.

23. **Adventitious Murmurs.**—Benedict's patient had Banti's disease with marked ascites. The apex beat was noted in the fourth interspace, just inside the nipple. The cardiac area, determined by auscultatory percussion and by Benedict's modification of that method using a tuning fork instead of percussion, extended to the second space and, while not abnormally large, was tilted upward to the left and downward to the right. There were no valvular murmurs, but clear, though not very forcible, valvular clicks at all valves. There was a rather prolonged sound accompanying the first heart sound, to which Dr. Solis-Cohen's designation of "crunching" applied nicely. Benedict's interpretation of the phenomenon was that the heart, crowded up by the ascites and tilted so as to strike still more forcibly against the left lung, produced an audible current of air from the vesicles into the bronchial tubes, somewhat analogous to that obtained in percussing to elicit the cracked-pot sound. The volume of air involved was, of course, not enough to produce an appreciable expiration, and it could not be made out that the crunching sound was increased either during expiration when the cardiac compression was unresisted, or during inspiration when we might suppose that the resisting air current would have intensified the sound. On the contrary, the inspiratory and expiratory breath sounds interfered with the clear perception of the cardiac crunch. However, respiration, unless very gentle, also interferes with the cracked-pot sound.

Benedict has noted the same phenomena in several other cases in which it might be supposed that the apex beat would have an unusually direct compressive action on the lung. Among these causes are mentioned ballooning of the intestine or particularly of the stomach, and unduly vigorous cardiac action, either with organic hypertrophy or due to functional causes. Cardiac displacement, adhesions tying down parts of the lungs so as to offer special local resistance to the apex beat, small effusions, etc., might also be expected to give rise to the same phenomenon. Another adventitious sound in connection with the apex beat is of fairly common occurrence. With the stomach distended, either spontaneously or artificially, especially when the contents are mainly gaseous, the cardiac impact is almost always appreciable. The stomach tube, with a funnel inserted, makes a very good monaural stethoscope, and one can hear very interesting sounds, as of gastric contraction (manifested by the churning of the contents, scarcely the muscular movement itself), the effervescence of a bicarbonate if the contents are strongly acid, the effervescence produced with hydrogen peroxid, etc. The respiratory and cardiac sounds are usually audible to some degree through the stomach tube. Aside from the detection of the cardiac impulse with the stomach tube in place, the first heart sound of its accompanying systolic murmur, is pretty regularly transmitted to some degree over the area of a distended stomach.

In quite a number of cases Benedict has been able to map out the gastric area by auscultatory percussion, with the patient's own heart acting as an assistant to furnish the

percussion. In some instances, there is purely a transmission of a heart sound, valve closure or murmur, as the case may be. In others, the apex beat either starts a wave in the liquid contents of the stomach, or seems directly to force a little air or liquid through the orifices, mainly the pylorus, or reflexly produces peristalsis which, in turn, may cause a sound in either of the ways just mentioned. Thus gastric sounds, corresponding to the heart beat, may be a mere thump, a crunch, swish or indescribable murmur.

Journal of the Indiana State Medical Society, Fort Wayne

November

31 Ophthalmia Neonatorum. G. F. Keiper, Lafayette.
32 Sketches of the Medical History of Indiana. G. W. H. Kemper, Muncie.
33 County Secretary as the Local Medical Historian. C. N. Combs, Terre Haute.

Medical Fortnightly, St. Louis

November 25

34 Postoperative Care and Treatment of Suprapubic Prostatectomy. D. W. Basham, Wichita, Kan.
35 Pyloric Obstruction Due to Extrinsic Causes. G. A. Beedle, Kansas City, Mo.
36 Plea for Conservative Surgery. H. D. Eaton, Chihuahua, Mexico.

Monthly Cyclopedia and Medical Bulletin, Philadelphia

November

37 Surgery of the Obese. R. T. Morris, New York.
38 Effect of Alcohol on Psychoneuroses. A. Gordon, Philadelphia.
39 Poliomyelitis; New Facts Concerning Its Etiology, Early Diagnosis and Treatment. T. A. Williams, Washington, D. C.
40 *Prevalence of Migraine in a Large Family. G. E. Price, Philadelphia.
41 Status of Trachoma in Philadelphia. C. P. Franklin, Philadelphia.
42 *Galactagogue Action of Infundibulin. I. Ott and J. C. Scott, Philadelphia.

40. **Migraine in a Family.**—The study of the family history given by Price is of interest because of: 1, the remarkable prevalence of migraine; 2, the unusual sensory manifestations in several of the cases, and, 3, the association of epilepsy with migraine in one case. A man, aged 21, complained of violent headaches occasionally preceded by numbness of the right side of the body. He stated that the headaches had occurred paroxysmally several times a year since he was six years of age, the longest interval between the attacks having been six months. The headaches occur, as a rule, in groups of three of six in rapid succession; thus, if he has one attack, he is apt to have more, and, if he has the fourth attack, he expects them to continue until he has had six. Many of his attacks are preceded by numbness and hyposthesia, commencing in the toes, and creeping up until they affect the leg, arm, trunk, face and tongue. He stated positively that these symptoms are most marked in the hand and foot, becoming less toward the proximal portion of the extremities, being very slight over the trunk; they are present to a marked degree, however, in the lips and tongue. At times he has been unable to control the movements of the affected arm and leg. The numbness lasts from twenty minutes to one hour, and is followed by severe headache on the side opposite the numbness, lasting from twelve hours to three days. Other attacks are preceded by visual disturbances; everything will look as if moving around in a circle; blurring of vision; hemianopsia. The paroxysms are always preceded by pallor and usually accompanied by vomiting, followed by relief of the headache. There is no history of unconsciousness. The grandparents, as far as could be learned, were free of any nervous condition. On the maternal side, the history is negative as to migraine, epilepsy or insanity.

On the paternal side, one aunt has severe attacks of migraine. Another aunt suffers from migraine but not severely. A third aunt had St. Vitus's dance when a child, and in adult life was exceedingly nervous. An uncle acted peculiarly, and was said to have "softening of the brain." The father, aged 67 years, suffers from attacks of blindness for a few seconds, then numbness of arm, tongue and lips, followed by severe headache. At times his speech is affected to such an extent that the family cannot understand what he is saying. The rest of this generation, thirteen in number, all reached adult life, but were free from any nervous disease. In the present generation there are eight children; seven have migrainous attacks, and three have marked numbness affecting one-half of the body.

42. **Galactagogue Action of Infundibulin.**—In the goat the authors found in the early nursing period that infundibulin injected into a vein in the ear rapidly and greatly increases the flow of milk. The nipple had a cannula inserted into it, and a water aspirator produced the suction necessary to empty the udder. The milk aspirated before and after the injection was caught in a graduated flask and measured every five minutes. This increased flow of milk is not due to an increased amount of blood in the udder, as infundibulin contracts the arterioles. This fact, the authors state, can be correlated with the increased size of the pituitary in pregnancy, although in these cases the enlargement is chiefly in the anterior lobe.

Buffalo Medical Journal

December

43 Abnormalities and Complications of the Pregnant State. L. G. Hanley, Buffalo.

Long Island Medical Journal, Brooklyn

November

44 The Isle of Pines as a Hibernaculum. W. Browning.
45 Tuberculous Peritonitis. C. H. Goodrich, Brooklyn.
46 Colles' Fracture. W. H. Rankin, Brooklyn.
47 Rupture of the Liver. W. A. Sherwood, Brooklyn.

Journal of the Kansas Medical Society, Kansas City

November

48 Vital Statistics in Relation to Public Welfare. W. J. V. Deacon.
49 Acute Poliomyelitis, or Acute Myloencephalitis. H. H. Bogle, Pittsburg, Kan.
50 *Relation of the Medical Profession to Medical Institutions and the State. M. T. Sudler, Lawrence, Kan.

50. **Relation of Medical Profession to Medical Institutions.**—Sudler believes that the medical profession of Kansas is overcrowded, and that unqualified and poorly educated men have been admitted to the profession and lowered it in the estimation of the public. This has fostered irregular practitioners such as osteopaths, chiropractics, christian scientists, etc. At present public charity is dealt out without any plan or organization. This is wasteful. The state should organize its hospitals and schools with definite relation to the needs of the people and the profession. The state should provide laboratories where pathologic and bacteriologic examinations can be made at moderate cost. As a matter of economy students can be instructed in these same laboratories. The state should maintain hospitals which would relieve physicians from doing charity work as far as possible. Before entering on the practice of medicine Sudler would ask that every candidate should have had at least two years of college work. Then four years in the medical school, and finally be required to pass an exhaustive practical examination.

Journal of the Oklahoma State Medical Association, Muskogee

November

51 Carcinoma of the Skin. E. S. Lain, Oklahoma City.
52 Cretinism. J. E. Hughes, Shawnee.
53 Internal Splint in Treatment of Fractures. H. E. Pearse, Kansas City, Mo.
54 Medical Ethics. L. S. Willour, Atoka.
55 A Case Requiring Herniotomy and Lipectomy. C. N. Ballard, Oklahoma City.
56 Poliomyelitis Anterior. J. Donohoo, Afton.

Kentucky Medical Journal, Bowling Green

November 1

57 Goiter. Indications for Operation and Results. J. R. Wathen, Louisville.
58 Tonsillectomy as a Routine Practice in Children of a Tuberculous Diathesis. W. C. White, Louisville.
59 Indications for the Technic of Gastro-Jejunostomy and Entero Enterostomy. W. H. Wathen, Louisville.
60 The Lactating Breast. T. K. Vansandt, Louisville.

Texas State Journal of Medicine, Fort Worth

November

61 Hookworm Disease or Uncinariasis. C. W. Stiles, Washington, D. C.
62 *The Reasons Why Prescriptions Fail. W. M. Brumby, Austin.
63 *An Efficient and Safe Cataract Dressing; a Modification of Holtz and Green's Operation of Entropion. W. R. Thompson, Fort Worth.
64 Inflammatory and Infective Changes Produced by Gall-Stones. M. P. Stone, Dallas

65 The Cystoscope and Some of Its Advantages. C. H. Harris, Fort Worth.
66 The Social Evil. J. P. Oliver, Caldwell.

62. Reasons Why Prescriptions Fail.—Brumby reviews some of the phases of the patent and proprietary medicine evil and urges physicians to familiarize themselves with the United States Pharmacopeia and the National Formulary. He endorses the work of the Council on Pharmacy and Chemistry.

63. Cataract Dressing.—Thompson uses a crinolin bandage over the regular bandage and dressing. The only new thing about this bandage is the technic in its application whereby the ears are prevented from coming in contact with the bandage when dry. This dressing fits snugly and has a feeling of protection. When it is removed on the second, third or fourth day, the crinolin portion over the face and eyes can be used as a mask externally by attaching tape and fastening around the head over the other dressing, or internally by placing next to the moist gauze and applying bandage over it. The absolute protection from external violence, as well as the complete immobilization of the eye and its appendages, renders this, in Thompson's judgment, one of the very best cataract dressings. If properly applied he firmly believes that it will keep many patients from infecting the eye by innocently meddling with the dressing.

Thompson has for a number of years, in cases of entropion, been doing an operation in part after Greene and Holtz with a modification of his own. The operation is as follows: An incision is made on the inner surface of the lid; in a line parallel to and about 2 mm. distant from the row of openings of the Meibomian ducts. It is carried through the conjunctiva and whole thickness of the tarsus, and should extend, in cases of complete entropion, from the inner to the outer canthus. An incision is next made through the skin about 2 mm. above the lashes, in operations on the upper lids, extending from the inner to the outer canthus. By a dissecting process the upper margin of this skin is elevated to a point above the upper border of the tarsus, which is exposed at three or four points by cutting out sections of the muscle, and sutures, three or four in number, are passed through the skin of the lower margin of this cut with curved needles at points corresponding to the exposed portions of the tarsus, and with the assistance of forceps the sutures are anchored into the upper portion of the tarsus by passing the needles partially through it. The sutures are then tied, care being taken to see that the cut edge of the skin comes in contact with the exposed areas of the tarsus. Material assistance can be had by placing a small probe or the end of a pair of forceps beneath the suture and making gentle pressure while the knot is being tied. The portion of skin which has been elevated by dissection is left free. Best results are obtained by seeing that the upper margin of this skin remains free until the lower margin is attached to the tarsus. The advantages of this over other operations is two-fold: first, the piece of skin from the lashes to where it is united to the tarsus is so short that it is not liable to stretch, thereby allowing the margin of the lid to again turn in; second, there is no sacrifice of integument, for that reason rendering the operation harmless in so far as the welfare of the lids are concerned.

Journal of the South Carolina Medical Association, Charleston

October

67 The Owen Bill and Its Opponents. S. A. Knopf, New York.
68 Uses of Carbonic Acid Snow in Surgery. S. C. Baker, Sumter, S. C.
69 Hookworm Disease as It Pertains to the Eye and Ear Specialty. L. O. Manildis, Greenville, S. C.
70 The Unspeakable Hookworm. F. J. Carroll, Summerville, S. C.
71 Value of Free Nasal Breathing. T. A. Quattlebaum, Columbia, S. C.

Woman's Medical Journal, Cincinnati

November

72 The Nervous Child—Its Management and Care. M. S. Macy, New York.
73 A Case of Onychogryposis. C. D. Mosher, Palo Alto, Cal.
74 Mental Hygiene. M. I. Neff, Brooklyn, N. Y.
75 Defective Speech in Backward and Feeble-Minded Children. B. C. Downing, Lexington, Mass.
76 The Bedside Widal Test. G. Gilman, San Francisco.
77 A Case of So-Called Cryptogenetic Infection. C. S. Rockhill, Cincinnati.
78 Precocious Diagnosis of Measles by Koplik's Sign. F. S. Mason, New York.

Southern California Practitioner, Los Angeles

November

79 Spengler's Treatment of Tuberculosis. W. J. Barlow, Los Angeles.
80 True and False Tabes. J. T. Fisher, Los Angeles.
81 Rabies, Its History, Etiology and Treatment. G. L. Cole, Los Angeles.
82 Measles and Its Eye, Ear, Nose and Throat Complications. H. A. Kiefer, Los Angeles.
83 Nervousness in Children. J. A. Jackson, Pasadena.
84 Hemorrhage from Middle Cerebral Artery. R. F. Palmer, Mesa, Ariz.
85 Anterior Poliomyelitis. E. Wing, Los Angeles.
86 Brains. G. D. Troutman, Tucson, Ariz.
87 Difficulties in the Cure of Tuberculosis. F. M. Pottenger, Monrovia, Cal.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Clinical lectures, single case reports and trials of new drugs and artificial foods are omitted unless of exceptional general interest.

British Medical Journal, London

November 23

1 Greek Medicine in Rome. T. C. Allbutt.
2 Four Cases of Pneumonic Plague. H. P. Sleigh.
3 Recent Plague Cases in Suffolk. H. H. Brown.
4 *Radium Therapy in Eye Diseases. A. Lawson and J. M. Davidson.
5 *Serum-Anaphylaxis. A. B. Sloan.
6 Bionomics of Pathogenic Organisms and Its Bearing on the Spread of Disease. A. C. Houston.
7 Organization and Results of the Typhoid Campaign in Southwest Germany. O. Lentz.
8 Dysentery Bacillus-Carriers. G. H. K. Macalister.
9 Diphtheria Bacillus-Carriers. J. A. Arkwright.
10 Interpretation of the Precipitin Reaction. D. A. Welsh and H. C. Chapman.
11 Anaerobic Culture of the Intestinal Microorganisms. W. J. Penfold.
12 Gastro-Enteritis Due to *B. Paratyphoid*. F. A. Bainbridge.
13 Recognition of *B. Typhosus* by Complement Fixation. H. R. Dean.
14 Serum Treatment of Dysentery. M. A. Ruffer and J. G. Willmore.

4. Radium Therapy in Eye Disease.—After an investigation into the possibilities of radium as a therapeutic measure in eye disease, the authors, A. Lawson and J. M. Davidson, concluded that radium is likely to prove of great service, both in the treatment of external diseases of the eye and in those of the eyelids. The method of applying the radium was crude, but satisfactory. The eye was first cocainized and the radium, which was contained in sealed glass tubes, permitting only the passage of beta and gamma rays, was applied directly to the affected part. The fingers of the operator were protected by enveloping first that part of the tube not required and then the fingers in a thick, continuous wrapping of lead foil. In no single instance did they observe the slightest ill-effects from the use of radium; no increase of inflammation or aggravation of symptoms occurred in any case, with the one exception of pain. It soon became evident that lesions of the cornea could be treated successfully with this time limit of five minutes by the same dose which, for affections of the skin and lids, required an exposure three or four times as long, and also that superficial lesions of the cornea frequently do not need any more than quite a small dose, such as 5 to 10 mg., applied once or twice as the case might demand. With regard to the frequency with which the exposures were repeated, they were guided entirely by the progress or otherwise of each individual case. When dealing with a virulent and highly dangerous process, such as a hypopyon ulcer, it was obviously necessary to get a result with the least possible delay, and consequently the exposure was repeated as soon as considered safe, if no improvement had been noted; whereas, in milder cases, they were content to wait longer for signs of amelioration, being anxious to find, if possible, the minimum number of sittings necessary to effect a cure. The effects of radium are continuously exhibited for a considerable space of time, extending into a matter of six weeks at least, and so some of the cases had only one sitting, and a perfect cure resulted. The margin of safety with regard to the minimum interval that should elapse between the sittings must obviously depend on the dose employed. The larger the dose, the sooner should its effects be produced, and the longer the interval between the sittings. Consequently, if a large dose was considered necessary at the first exposure, they seldom repeated it with less than a week's interval, except it happened to be noted that the disease continued to spread in

spite of the treatment, in which case they considered that a second exposure might safely be given at a rather shorter interval.

5. **Serum-Anaphylaxis.**—The chief point of interest in Sloan's case of diphtheria was the occurrence of sudden collapse after the injection of serum at the onset of the second attack. Sloan has no doubt that the grave condition was due to serum-anaphylaxis: (1) The collapse occurred within two hours of the injection without other apparent cause and while the child was lying quietly in bed; (2) the collapse was accompanied by the almost simultaneous appearance of a marked serum-rash of the urticarial type. Apart from the twenty-four hours' urgent illness following the injection, the prolonged febrile period thereafter and the slow convalescence were chiefly due to the serum phenomena. It is Sloan's opinion that, until we have more accurate knowledge of the circumstances bringing about anaphylaxis, we should be particularly cautious not to inject foreign serums without good reason, because we may by doing so render our patients so sensitive that a future necessary injection may cause grave consequences.

Lancet, London

November 12

15 Greek Medicine in Rome. T. C. Allbutt.
16 A Case of Multiple Myeloma. O. T. Williams, E. R. Evans and E. Glynn.
17 Radical Operation for Malignant Disease of the Testis. R. Howard.
18 Treatment of Pulmonary Tuberculosis by Intravenous Injections of Chinosol with Formaldehyd. J. McElroy.
19 Operative Treatment of Papilloma of the Bladder. J. W. T. Walker.
20 Chronic Bronchitis and Emphysema as the Result of Acute Pneumonia. S. West.
21 Aortic Regurgitation. W. Broadbent.

November 19

22 Prospect Before the Medical Student of To-Day. J. A. Lindsay.
23 Hereditary Cranio-Cleido-Dysostosis. D. C. L. Fitzwilliams.
24 *Pulmonary Tuberculosis Treated by Continuous Antiseptic Inhalation. D. B. Lees.
25 *Fractures in the Neighborhood of Joints. R. Jones.
26 *Use of Potassium Bichromate in the Treatment of Phthisis. J. B. Tombleson.
27 Compound Fracture with Tetanus Symptoms. E. K. Williams.
28 Osteomyelitis of the Left Clavicle. A. MacDonald.
29 Uterus Bicornis Unicollis. J. L. Masterman-Wood.

24. **Pulmonary Tuberculosis.**—In November, 1909, Lees published the details of the method of treatment employed by him, and narrated thirty cases of incipient or early pulmonary tuberculosis in which it had been employed with success. Now he records the present condition of these cases, and adds an account of twenty subsequent cases in which the same method of treatment has been used. The thirty cases reported were all incipient or comparatively early cases, though three or four of them were very acute and rapidly advancing when the treatment was instituted. In every one of these thirty cases the result is highly satisfactory. Some of the twenty additional cases now reported came under treatment at a much later stage of the disease or were attended with grave complications. In such instances recovery must be comparatively slow, and the final issue may be doubtful. Any case of pulmonary tuberculosis, if allowed to progress unchecked for many months, may easily reach a condition which is incurable by any form of treatment. But Lees' contention in these two papers is that this ought never be allowed to happen. Pulmonary tuberculosis is recognizable and ought to be discovered before there is any breaking down of lung tissue. To suspend the diagnosis until tubercle bacilli are detected in the sputum is like delaying the diagnosis of cancer until the glands are involved.

25. **Fractures in the Neighborhood of Joints.**—Jones pays more attention to function than appearance, considers correct alignment of more importance than meticulous care in reposition of fragment, believes that pain is always an indication for physiologic rest, and therefore deprecates early forced passive movements.

26. **Potassium Bichromate in Treatment of Phthisis.**—Six cases of phthisis treated by the internal administration of potassium bichromate are reported by Tombleson. He gives the potassium bichromate in doses of ¼ gr. (2½ minims of a 10 per cent. solution in water) either alone or in a tonic mixture (phosphate, hypophosphite, or simple iron), such dose to be taken in a wine-glass of water after food, at first twice and later three times a day. The first dose and possibly the second may cause vomiting, but this does not matter, as, in his experience, toleration is easily established without missing a dose. The color of some of the mixtures changes from yellow to green, but this seems in no way to impair the efficacy of the mixture. Of these six patients the last four do not know they are under any special treatment. Improvement has been noticeable after the expiration of the first fortnight of treatment.

Annales de l'Institut Pasteur, Paris

September 25, XXIV, No. 9, pp. 673-752

30 *Oriental Sore. (Recherches sur le bouton d'Orient. Cultures, reproduction expérimentale, immunisation.) C. Nicolle and L. Manceaux.
31 Efforts to Increase Resistance of Trypanosomes. (Essai d'obtention d'une race de Nagana résistante d'emblée à l'Emétique.) F. Hechenroth.
32 Immunity of Rabbits to the Bacillus of Hog Cholera. (Immunité des lapins contre le b. suipesticus.) J. Shoukevitch.
33 Influence of Concentration of Saccharose in Alcoholic Fermentation. Rosenblatt.

30. **Oriental Sore.**—Nicolle and Manceaux have succeeded in cultivating the protozoon which they believe is responsible for Oriental sore, and in reproducing the lesion in dogs and monkeys after a period of incubation ranging from 16 to 166 days. They find many points of resemblance between Oriental sore and kala-azar; recovery from the latter protects the dog against infection from the virus of Oriental sore and affords a partial protection to the monkey. The evidence on hand suggests that the dog is the natural reservoir for the virus of Oriental sore. This animal thus seems to be the agent involved in the etiology of the Leishmanioses.

Archives des Maladies du Cœur, Etc., Paris

November, III, No. 11, pp. 641-704

34 Action of Roentgen Ray on the Blood in Diabetes. P. Menetrier and A. Touraine.
35 Fibrillation of the Auricles and Extrasystoles of the Ventricles. (Remarques sur les extrasystoles intercalées.) T. Lewis.
36 Case of Congenital Hemolytic Jaundice. C. E. Paris and Giroux.

Bulletins de la Société de Pédiatrie, Paris

October, XII, No. 7, pp. 389-434

37 *Syphilitic Rachitis and the Wassermann Reaction. C. Leroux and R. Labbé.
38 Traumatic Abscess in the Brain. Recovery After Operation Seven Months Later. G. Triboulet and M. Savariaud.
39 *Lumbar Drainage in Purulent Meningitis. G. Rosenthal.
40 Acute Poliomyelitis Simulating Landry's Paralysis. G. Schreiber.

37. **Syphilitic Rachitis and Wassermann's Reaction.**—Leroux and Labbé found the reaction positive in the fourteen cases of rachitis reported whenever there were manifestations of virulent inherited syphilis. In the cases in which the reaction was negative there were only dystrophic and rachitic malformations without any virulent manifestations. The findings confirm the assumption that rachitis may have a syphilitic origin, yet it is not of a syphilitic nature; syphilitic rachitis seems to be mainly the result of the dystrophic influence of inherited syphilis. It is probable that any chronic infection or intoxication occurring at a certain period of ossification may be an efficient cause of rachitis. It has been observed after malarial infection in infancy and in diabetic infants.

39. **Continuous Lumbar Drainage.**—Rosenthal gives an illustrated description of the needle which he uses for lumbar puncture, and the sheath which is left permanently in the opening for continuous drainage. Gorse has reported the cure of a patient with suppurative meningitis, the treatment including this permanent lumbar drainage kept up for thirteen days.

Presse Médicale, Paris

November 9, XVIII, No. 90, pp. 841-848

41 Direct Illumination of the Pelvis. (Endopelyscopie.) F. Jayle.

November 12, No. 91, pp. 849-856

42 Therapeutics in the Medical Curriculum. (La chaire de thérapeutique à la Faculté de médecine de Paris.) A. B. Marfan.

Semaine Médicale, Paris

November 16, XXX, No. 46, pp. 541-552

43 Toxins of the Placenta. R. de Bovis.

Archiv für Gynaekologie, Berlin

XCII, No. 1, pp. 1-277. Last indexed Sept. 11, p. 1059

44 *Treatment of Tubal Pregnancy in Early Months. (Grundsätze und Erfahrungen in der Behandlung der Tubenschwangerschaft der frühen Monate.) H. Fehling.
45 Connections Between the Blood-Vessels in the Placenta of Twins with Single Ovum. F. Schatz.
46 Blastomycetes Isolated in Pure Cultures from Human Cancers. (Untersuchungen zur Aetiologie des Carcinoma und über die pathogenen Blastomyceten. II.) G. Leopold.
47 Operative Treatment of Uncomplicated Uterine Hemorrhage. (Behandlung uncomplicirter Blutungen insb. die radicale Beseitigung der klimakterischen und präklimakterischen mittelst vaginaler Corpusamputation.) H. Fürth.
48 Operations for Genital Prolapse. B. Krönig.
49 Placenta Prævia and Anterior Vaginal Hysterotomy. A. Döderlein.
50 *Curability of Cancer Under Palliative Measures. (Zur Frage der Heilbarkeit des Krebses.) R. F. Bretschneider.
51 *Forensic Examination of Breast Milk. (Die Frauenmilch und ihre kriminelle Bedeutung.) J. Hertzsch.
52 Puerperal Auto-Infection. W. Zangemeister.
53 *Gynecologic Operations in Twenty-Three Years at University Gynecologic Clinic at Leipsic. P. Zweifel.
54 *Ultimate Results of Abdominal Panhysterectomy for Carcinoma. E. Aulhorn.
55 Bath-Water in the Vagina. (Eindringen von Badewasser in die Scheide.) B. Schweitzer.
56 Vaginal Ovariotomy in Sixty-Four Cases without a Death. F. Lichtenstein.

44. **Tubal Pregnancy.**—Fehling reviews his experience with 300 cases of tubal pregnancy in which he operated. In his latest series of 170 cases none of the women with tubal abortion succumbed, but seven died in the fifty cases of rupture of the gravid tube; of this number five died within two hours of the operation, the condition not permitting recovery; one died of yellow atrophy of the liver without peritonitis and the seventh succumbed to peritonitis resulting from an operative injury of the intestine. Only 12.4 per cent. of the patients had not borne children before. In 52 per cent. of the patients the other adnexa were more or less pathologic. The extra-uterine pregnancy occurred more than once in five of the cases. The interval between the last pregnancy and the extra-uterine averaged over four years and ranged up to sixteen. He comments on the rarity of extra-uterine pregnancy in private practice, having encountered only 10 cases among 1,000 private obstetric patients.

50. **Curability of Cancer Under Palliative Measures.**—Bretschneider declares that the prognosis of cancer in the so-called hopeless cases should be guarded, as instances are not lacking in which an apparently incurable growth subsided under merely palliative measures. He reports a typical case of the kind, a woman of 53 having a supposed inoperable carcinoma of the uterine cervix, but it was so favorably influenced by repeated palliative operations that at present there is not a trace, either macroscopic or microscopic, of malignant disease at the spot, and the metastatic foci have evidently been arrested in their growth and have partially retrogressed. The general health of the patient is normal and she has no disturbances of any kind. The clinical cure is thus complete, although she still carries numerous cancer foci; the carcinoma cells seem to have lost their proliferating capacity and the foci have become latent. When first seen, suspicion of kidney disease and dilatation of the left ventricle complicating the inoperable adenocarcinoma rendered the outlook very grave. After curetting and cauterization with 50 per cent. zinc chlorid there was some collapse, requiring camphor and heart tonics, but the patient was dismissed from the hospital in two weeks. She returned seven months later in very good general condition and the cancer had materially subsided. The same technic was applied again and with good results. Four months later she returned on account of hemorrhages and the cancer was then deemed operable, but at the laparotomy the peritoneum was found studded with cancerous nodules, and nothing further was done, as the diffuse peritoneal carcinosis had destroyed all hope of success. The cervix cancer was merely curetted and cauterized as before. A year later, two years after the first exceobleation, the patient was seen again, and the aspect was that of perfect health for her age, 55. There had been no further hemorrhages, and the cervix presented merely the usual senile aspect. There are no records, he adds, of the necropsy findings in such cases of unexpected clinical cures of cancer, but there is nothing theoretically to prevent the assumption that carcinoma foci may completely retrogress. There is evidently a constant battle between the defensive forces of the organism and the proliferating forces of the carcinoma cells. Changes in the blood, as after fever or profuse hemorrhages, and possibly after deep cauterization of the focus, seem to exert sometimes a favorable action on the malignant foci. When the balance between the defences and the cancer cells is maintained and neither is victorious, the cancer is kept in a latent stage, but at any moment when the defensive forces are weakened by any cause the cancer may get the upper hand. Such an assumption would explain the late recurrences of cancer after a long period of latency. The case reported, and others on record, indicate that the defensive forces of the organism are powerfully seconded in their struggle with the cancer cells when the latter are vigorously cauterized or are affected in some other way. There are evidently factors still unknown to us at work in these cancer cases, and something is liable to turn up that will unexpectedly diminish the proliferating capacity of the carcinoma cells and thus induce a turn for the better. Such a possibility should always be borne in mind in the management of inoperable cancer, and the prognosis should not be so grave as to drive the patients into the hands of quacks, especially as the latter are liable here and there to get the credit of the unexpected turn for the better which may occur at any moment.

51. **Forensic Importance of the Lacteal Secretion.**—Hertzsch concludes from his research on fifty cases that the absence of colostrum-corpuscles indicates that the child was viable but not necessarily at term. The presence of colostrum-corpuscles alone is no criterion for determination of the date of delivery or age of the fetus or whether the child was suckled or whether this is the first pregnancy or not. If the breasts secrete ripe milk the presence of colostrum-corpuscles does not conflict with the assumption that the child was born at term. In a case of supposed infanticide he certified that a viable child had been born, basing his statement on the copious supply of ripe milk free from colostrum-corpuscles or other formed elements, and circumstances later confirmed the correctness of his testimony.

53. **Twenty-Three Years of Gynecologic Operations.**—This issue of the *Archiv* is a *Festschrift* on the occasion of the centennial of the university clinic for women at Leipsic. Zweifel reviews the 4,062 laparotomies, and devotes a hundred pages to detailed study of technics and results.

54. **Ultimate Outcome of Abdominal Hysterectomy for Cancer.**—Aulhorn compares the outcome with various technics in 420 cases of carcinoma of the uterus during the last eight years; in 221 other cases the growth was inoperable. In the operative cases there were nine women who had never borne children, while the rest averaged six children apiece. Of the 255 patients operated on over six years ago, fifty-two have had no recurrence to date, that is, 51 per cent. according to Winter's formula. Recurrence in the fifth and sixth years was observed in two cases.

Deutsche medizinische Wochenschrift, Berlin

November 10, XXXVI, No. 45, pp. 2081-2128

57 Vaginal Methods in Obstetrics. (Dilatation nach Bossi, Metreuryse, Kolpohysterotomie.) P. Jung.
58 *Treatment of Laryngeal Tuberculosis. G. Schröder.
59 Spontaneous Cure of Tuberculous Pneumothorax. R. Fried.
60 Treatment of Cancer in Upper Esophagus. (Hoher Speiseröhrenkrebs und seine Behandlung.) L. W. A. Pernice.
61 *Subcutaneous Infusion in Eclampsia. K. Frankenstein.
62 Units and Dosage with Radium. (Messmethoden und "Einheiten" in der biologischen Radiumforschung.) S. Loewenthal.
63 *Roentgen-Ray Treatment of Myomas. B. Schindler.
64 Index of Hardness of Roentgen Tubes. (Objektiver Härtemesser mit Zeigerausschlag für den Röntgenbetrieb.) H. Bauer.

58. **Treatment of Laryngeal Tuberculosis.**—Schröder has had 416 patients with laryngeal tuberculosis in his care during the last fourteen years and the course of sanatorium treatment for each averaged 140 days. He estimates the frequency of laryngeal tuberculosis as a complication of chronic pulmonary tuberculosis in 20 per cent. of the cases in which sana-

torium treatment is indicated, and he urges careful examination for it in every case of lung trouble. Institutional treatment is advisable, as the general treatment is the main thing; only as the lungs improve and heal is there prospect of the laryngeal process healing. Appropriate surgical measures may prove useful adjuvants, but tuberculin treatment should be instituted with extreme reserve and caution. A relative cure was obtained in 24 per cent. of his 416 cases, but only in 15.2 per cent. of the 308 febrile cases and in 19 per cent. of the "open" tuberculous cases.

61. **Saline Infusion in Eclampsia.**—In the case reported by Frankenstein the eclampsia developed during labor and the convulsions persisted after delivery. No benefit being apparent from narcotics, 1 liter of salt solution was injected subcutaneously, repeated six hours later, after which there were no further convulsions; fifty minutes after the second infusion copious diuresis set in and the patient was cured. Notwithstanding the fine results in this case he thinks it would be better to use a 4 per cent. sugar solution or hypotonic salt solution; the ordinary salt solution is liable to make too many demands on the kidneys in their morbid condition. Hypotonic solutions are compensated by the hypertonic composition of the blood. He has had ample experience in regard to the harmlessness and the usefulness of a 4 per cent. sugar solution in his operative gynecologic work. The subcutaneous route is necessary in eclampsia, as there is no time to waste on intestinal infusion, but physiologic salt solution, he declares, should be banished from the treatment of eclampsia; with impending or actual heart failure any infusion is perilous.

63. **Roentgen-Ray Treatment of Myoma.**—Schindler reports continued and repeated success with this method of treating myoma, giving the details of three cases. Under the exposures the complicated myomas are transformed into harmless small tumors, and by the menopause induced the cure is completed until scarcely anything is left of the myomas. The objection that the relics of the myoma might be the seat of malignant degeneration later applies equally well to other measures, such as castration. The Roentgen-ray treatment spares the patient the laparotomy and, he says, is entirely harmless, so that one is justified in giving the method a trial, at least, before resorting to an operation. In the case of a woman of 50, a myoma the size of a child's head, with excessive menstruation, subsided one-half in size and the menopause came on under eleven exposures in three weeks, with four exposures later.

Deutsche Zeitschrift für Chirurgie, Leipsic

October, CVII, No. 113, pp. 1-296

65 Differential Diagnosis of Fetal Chondrodystrophy and Imperfect Osteogenesis. M. Sumita.
66 *Deforming Arthritis in the Young. G. K. Perthes.
67 Jonnesco's Method of Spinal Anesthesia. (Die Rachi-Anästhesie mit Stovain-Strychnin.) E. Juvara.
68 Transplantation of Hypophyses and the Action of this Experimental Hypersecretion. A. Exner.
69 Experimental Removal of the Pineal Gland. A. Exner and J. Boese.
70 *Improved Extension Treatment of Fractures. (Unterbrechung der Längsextension durch Einschaltung von Gummizügen.) A. Wildt.
71 Omentum Plastics for Perforated Duodenal Ulcer. (Netzplastik beim Ulcus duodeni perforatum.) G. Axhausen.
72 *Production of and Technic for Use of Compressed Air in Hospitals. (Luftkompressor in Krankenhaus.) F. Kuhn.
73 *Dislocation of Tarsometatarsal Articulations. (Luxationen im Lisfrancschen Gelenk.) Grunert.
74 Plastic Operation on Nerves for Paralysis of the Gluteal Muscles. A. Stoffel.
75 *Saline Infusion in Peritonitis. R. Bertelsmann.
76 Plastic Operation for Inguinal Eventration. (Eine Tenomyoplastik bei Eventratio inguinalis.) J. M. Jacobovici.

66. **Deforming Arthritis in the Young.**—Perthes believes that the frequency and importance of deforming arthritis of the hip joint in the young have never been sufficiently appreciated; he had no less than six cases of it last year. Trauma can rarely be incriminated; in one of his cases there had been a suppurative process in the hip joint in infancy, but the symptoms of the deforming arthritis did not develop until a number of years later. Pain and tenderness in the joint are rare, although long walking may induce spontaneous pains which may be experienced in the knee, but in many cases there is no painfulness at any time. The limping gait is due probably to insufficiency of the abductor muscles. In all the cases that have been studied to date, (twenty-six unilateral and twelve bilateral) the course of the pathologic changes was always slowly progressive, but the interference with movement and the spontaneous painfulness may grow less for a time. In treatment, systematic massage and exercises, especially of the abductors, are recommended and immobilization warned against. With much deformity of the bone operative correction may be advisable. The details of the thirty-eight cases on record are summarized.

70. **Improved Technic for Extension with Fracture.**—Wildt calls attention to the importance of counteracting contraction more than is possible with the ordinary Bardenheuer technic, especially after the adhesive plaster has loosened up a little. He describes the technic with which he accomplishes this by interposing a rubber strip in the plaster where it passes over the fracture. The elastic strip is sewed to the strip of plaster, leaving fulness enough so the rubber can stretch by 1 cm. The adhesive plaster is then applied as usual, but where it crosses the fracture it is cut across, leaving the elastic rubber to stand the strain alone at this point.

72. **Compressed Air for Massage, Etc.**—Kuhn calls attention to the great therapeutic value of air under high pressure applied locally to organs, fractures, etc. The result is a total anemia of the part which is followed by a hyperemic reaction, inducing what he calls massage of the blood. The hyperemia produced in this way is more intense than by any other means, while the action on the organs and parts of the air under high pressure is extremely gentle. He applies the high pressure in a double sac in which the limb is placed, the air circulating between the double walls of the sac, or a double sac is made to fit over the organ or part to be treated. He states that this high-pressure massage is useful as an adjuvant during and after the Bier hyperemia technic, while it is an independent method for effectually treating edema, varicose ulcers, excessive callus and joint fractures. The alternation of anemia and hyperemia, he states, is on a scale never before realized, revitalizing the parts and promoting absorption of pathologic fluids by its imitation of the natural stimulation of metabolism. A tank of compressed air can be used, but it is better to have a large amount to use more freely, and he has devised a special apparatus for compressing the air very economically in hospitals where power can be available. The apparatus was described in the *Deutsche med. Wochenschrift*, Aug. 4, 1910, page 1445.

73. **Dislocation of Tarsometatarsal Joints.**—Grunert has found fifteen new cases on record of dislocation of Lisfranc's joint since Lenormant's compilation of ninety-six cases in 1908, and here gives the details of them all with two additional cases from his own experience. The luxation was total in fifty-eight. Reduction by manual pressure succeeded in only 35 per cent. of the total 105 cases, but the patient got along well with the uncorrected total dislocation, while the outcome was most disappointing in the operative cases. The experiences related indicate that operative interference is liable to do harm ultimately rather than good in the total luxations, but that when only a single bone is dislocated, operative interference is justified and has always proved effectual. Any attempt to resect bone merely weakens the foot.

75. **Extensive Saline Infusion in Treatment of Peritonitis.**—Bertelsmann strives to restore approximately normal conditions in the circulation in peritonitis by saline infusion before he attempts any operation. In fourteen cases of peritonitis last year, treatment was by intravenous saline infusion of nearly 4 liters of salt solution before and during the operation. Large compresses were laid over the intestines when the abdomen was opened and the abdominal walls were fastened over them with silk sutures in such a way that no intestines could protrude while a broad slit was left open between the lips of the wound. After the operation subcutaneous or saline infusion is continued at need up to 20 liters in the first two days. By this copious flushing of the vascular system the stagnation in the peripheral vessels is combated and the heart given something to pump on; small amounts of salt solution do not accomplish this. He operates in every case of peritonitis, no matter how desperate it may appear. Of the six

fatalities in his series, five were in patients practically moribund when first seen. The only death that had not been expected was in a woman who died of embolism twelve days after the operation. He suggests several queries for further research: 1. The share in peritonitic collapse of the inflammatory congestion, and whether this is to be combated or regarded as a favorable element. 2. Is the collapse during operations for peritonitis due to the fact that the blood rushes into the vessels in the abdomen when all pressure is removed from these vessels, and can this assumption be sustained by experimental research? 3. Does bacteriemia frequently accompany peritonitis? 4. Is existing bacteriemia influenced favorably or unfavorably by saline infusion?

Fortschritte der Medizin, Leipsic

November 3, XXVIII, No. 44, pp. 1377-1408

77 General Anesthesia. (Die Allgemein-Narkose.) P. Sick. Commenced in No. 42.
78 Aneurysm of the Hepatic Artery. D. G. Zesas. Commenced in No. 42.
79 Treatment of Chronic Dyspepsia in Infants. (Therapie der chronischen Ernährungsstörungen des Säuglings.) Sittler.

Jahrbuch für Kinderheilkunde, Berlin

November, LXXII, No. 5, pp. 523-660

80 *Large Doses in Tuberculin Treatment of Children. A. Fuchs.
81 Normal Metabolism and Nitrogen and Sulphur Metabolism in Rachitic Dwarf Growth. (Der Stickstoff- und Schwefelstoffwechsel in Fällen von rachitischen Zwergwuchs und ein Beitrag zum normalen Stoffwechsel eines fünf Jahre alten Knaben.) H. Schwarz (New York).
82 Pathology of Growth in Infancy. (Zur Pathologie des Wachstums im Säuglingsalter.) E. Schloss.
83 Hydronephrosis from Ureter Deformity. E. v. Joukowsky.
84 *Experimental Phosphorus and Strontium Sclerosis. F. Lehnerdt.
85 Tracheotomy in 676 Cases, 1899-1908. J. C. Schippers.

80. Treatment of Tuberculosis in Children with Large Doses of Tuberculin.—Fuchs reports the application in a number of cases of Schlossmann's method of accustoming the child to large doses of tuberculin. About two months was all that was needed to bring them to a dose of 1 gm. The results were very disappointing; no benefit was realized in any instance and the impression in some cases was that the tuberculosis was directly aggravated. Injection near the focus of the surgical lesion induced a peculiar and very pronounced cutaneous reaction, evidently an anaphylactic phenomenon, peripheral to the lesion. .

84. Phosphorus and Strontium Sclerosis.—Lehnerdt's recent experimental research shows the importance of the influence of single elements on the growth of the bones, and opens a comparatively new field for physiologic research and for explanation of the action of drugs.

Medizinische Klinik, Berlin

November 13, VI, No. 46, pp. 1209-1244

86 Anatomic Bases for Physical Diagnosis. R. Oestreich.
87 Biology of Blood in Women During Gestation Period. (Zur Biologie des Blutes in der Gestationsperiod des Weibes.) M. Neu.
88 *Syphilis of Pancreas and Other Organs. J. Fey.
89 *Convulsions in Whooping-Cough. (Zur Frage der Krampfanfälle während des Keuchhustens.) A. Schiller.
90 *Function of Appendix. (Hat der Wurmfortsatz eine Funktion?) Härtig.
91 Resemblance of Features in Foreign Races. (Anähnlichung der Gesichtszüge in fremdem Rassenmilieu.) Lemer.

88. Syphilis of the Pancreas.—Fey reports a case of visceral syphilis in which the symptoms from involvement of the pancreas were exceptionally prominent. The patient was a man of 42, otherwise healthy, who acquired syphilis at 21 and took five courses of specific treatment in the course of three years and was free from symptoms for nearly twenty years. Then he had an attack of what seemed to be severe influenza from which he did not seem to recover, and hectic fever, night sweats and cough suggested tuberculosis. There was occasional profuse diarrhea ceasing suddenly after five or six days and, after a year of these symptoms, attacks of pain, most pronounced in the upper abdomen, coming on independent of the intake of food and persisting for one or three hours. Annoying, persistent eructations and enlargement of the liver and spleen, with a little ascites, suggested tuberculous peritonitis. The feces at this time became clay-colored and soft, and sugar was found in the urine. The diagnosis then was changed to carcinoma of the liver, but the symptoms resisted all treatment on these bases and the patient lost nearly a hundred pounds in weight in the course of the eighteen months. Functional tests of the pancreas gave positive findings with the Cammidge and trypsin tests and the Schmidt nucleus test, while the fat content of the stool averaged 39.4 per cent. and a drop of adrenalin in the left eye induced pronounced mydriasis in twenty-five minutes. The diversity of the symptoms, the protracted course of the syndrome, the hectic fever and positive Wassermann reaction convinced Fey that syphilis was responsible for the whole trouble, and under mercurial inunctions and potassium iodid the fever disappeared in three days, the glycosuria in one week, and the liver and spleen returned to normal size in less than a month. The improvement continued to a clinical cure in a few weeks, but the persistence of the Cammidge reaction and positive adrenalin test indicate that the pancreas still has some interstitial pathologic process, although the gummas probably responsible for the severe symptoms previously observed had retrogressed. The syndrome of visceral syphilis is liable to involve the most various organs and thus present a Protean variety of symptoms, never encountered under other conditions.

89. Convulsions in Whooping-Cough.—In the first of Schiller's four cases, the convulsions were evidently the result of latent tetany in a female infant, 17 months old, artificially fed. The prompt success of treatment for the spasmophilic diathesis: castor oil, tea, phosphorus-cod liver oil and abstention from milk, with symptomatic measures, confirms the assumption of tetany as the cause of the convulsions, the whooping-cough having continued its course unmodified. In the second case the convulsions were merely a casual coincidence, ushering in severe varicella with otitis media. Measures directed against the fever, cold packs and aspirin, banished the convulsions. This patient was a boy of 3. In the third case the infant began to cough when 4 days old, and at three weeks the closure of the glottis initiating the cough frequently persisted, causing dangerous asphyxia from the laryngospasm. The trouble in this case was an actual complication of the whooping-cough, peculiarly dangerous on account of the suffocation recurring without warning and liable to prove fatal unless the child was watched incessantly. In the fourth case a mustard pack was applied on account of beginning bronchopneumonia in an infant nearly 2 years old, with whooping-cough for six weeks. The child was otherwise healthy, but six hours after the mustard pack, applied according to Heubner's technic, severe convulsions developed, with cyanosis, requiring artificial respiration and rapidly exhausting the child, with high fever and death from heart failure the next day. Ibrahim recently reported fatal convulsions following the mustard pack in a case of whooping-cough. If Schiller had known of this experience he would have applied lumbar puncture in his case to counteract the heat congestion from the mustard pack, superposed on the febrile tendency of the incipient bronchopneumonia.

90. Function of the Appendix.—Härtig suggests that the appendix may have an analogous function to the automatic lubricators in automobiles to supply a lubricant at points where it is especially needed. The little reserve of intestinal juice in the appendix may be just what is needed at the bottom of the well formed by the cecum to aid in passing the feces along.

Monatsschrift für Geburtshilfe und Gynäkologie, Berlin

November, XXXII, No. 5, pp. 617-834

92 Puerperal Bradycardia. J. Novak and L. Jetter.
93 *Varicocele in Pregnant Women. H. Cramer.
94 *Intra-Uterine Respiration. F. Fromme.
95 *Obstetric Auto-Infection. F. Fromme.
96 *Technic for Combined Examination. (Zur kombinierten Untersuchung.) J. Sonnenfeld.
97 Polypous Cysts in Vagina. (Ein seltener polypöser Anhang der Vaginalportion.) H. Peters.
98 Congenital Transmission of Tuberculosis. O. Pankow.
99 Pelvis Manikin. (Ein Modell des weiblichen Beckens.) E. Martin.

93. Varicocele of Pregnant Women.—Cramer ascribes the development of varicose veins to primary changes in the walls of the vein under the influence of toxic action. Toxic action from the internal secretions is peculiarly liable to occur in

the pregnant woman and predisposing mechanical causes enhance this tendency. He has noticed that inguinal hernia in women frequently dates from a pregnancy, and he explains this by the spreading of the inguinal canal from the enlargement of the veins passing through it. The stretched canal does not retract again when the enlarged veins subside to normal size. The condition thus left favors development of a hernia. In the male, the varicose enlargement of the corresponding vein occurs outside the inguinal ring, but the corresponding varicocele in women develops in or inside the ring. Since he has been studying this subject he has found complaints of pains in the inguinal region in pregnant women much more common than he had supposed. In one case of the kind the pains were so severe and the disturbances so great that he was compelled to operate, and he gives an illustration of the varicocele removed from each side, at the sixth month of pregnancy. The external ovarian vein was as large as a man's thumb, and was stretching the external inguinal ring so that a finger could be inserted on each side of the engorged vein. There was no tendency to hernia on either side but after resection of the varicocele the tendency of the canal to gape was corrected with sutures as for inguinal hernia, and the pregnancy progressed undisturbed.

94 and 95. **Prophylaxis of Puerperal Fever.**—In the course of a discussion of intra-uterine breathing, sterilization of the hands and "self-infection," Fromme reiterates that the greatest progress realized in obstetrics in the last few years is that we have learned to distinguish between puerperal infection and puerperal intoxication. He regards infectious puerperal fever as the result of importation from without of virulent alien germs capable of penetrating into living tissue and thus setting up general sepsis. The putrefaction bacilli normally in every vagina are not capable of this. If alien germs from without can be kept completely away from the vagina and uterus shortly before, during and after childbirth, there will be no true infectious puerperal fever. When certain that this is the case, we can be confident that the parturient will recover without severe illness. The woman's own germs are incapable of setting up true puerperal fever, and if fever does occur it is merely an intoxication fever from retained membranes or obstruction to the outflow of the lochia, and it subsides when the substances are rinsed out which have been providing the culture material for the patient's own germs.

96. **Combined Examination.**—Sonnenfeld has found that any means to divert the patient's attention away from the examination generally suffices to induce the desired relaxation of the abdominal walls for "combined examination." He has found that a simple means to divert the attention is to have the patient hook the fingers of her two hands together and pull vigorously. This has frequently succeeded in his experience when other, more complicated measures failed.

Münchener medizinische Wochenschrift

November 8, LVII, No. 45, pp. 2289-2332

100 Post-Mortem Wassermann Reaction. C. Nauwerck and M. Weichert.
101 Dungern's Simplification of Wassermann Reaction. (Was leistet die v. Dungernsche Methode der Syphilisreaktion.) A. Spiegel.
102 Importance of Early Hygiene and Care in Prevention of Nervous and Mental Disease. (Bedeutung einer geordneten Säuglings- und Kleinkinderfürsorge für die Verhütung von Epilepsie, Idiotie und Psychopathie.) M. Tslemich.
103 Idem. J. Hoppe.
104 Advantages of Peroral Intubation for Operations on Face and Throat. (Die intratracheale Insuflation von Meltzer—New York und Kuhns perorale Intubation; unsere Erfahrungen über die letztere.) E. Köhler.
105 Pulmonary Tuberculosis and the Thorax Musculature. (Lungentuberkulose und Brustmuskulatur.) C. Fischer.
106 Ehrlich's "606" in Ophthalmology. (Das Ehrlichsche Präparat 606 bei Augenkrankheiten.) F. Schanz.
107 *Severe By-Effects After Injection of Ehrlich's "606." (Blasenstörungen und andere schwere Nebenerscheinungen nach einer Injektion von Ehrlich "606.") E. Eitner.
108 Foreign Body in Lung. (Fremdkörperextraktion aus der Lunge.) H. Seidel.
109 *Toxic Hyperkeratosis. Ruete.
110 Multiple Neuromas on Spinal Roots in Nine-Months' Infant. R. Graupner.

107. **Bladder Disturbances After Use of Ehrlich's "606."**—Eitner reports a case in which an injection of "606" was followed by retention of urine and constipation with abolition of the reflexes, the clinical picture being identical with that of the two cases reported from Prague and mentioned in these columns Sept. 3, 1910, page 898. Eitner never uses methyl alcohol, so that the disturbances cannot be explained in this way, which was the explanation accepted for the Prague cases. He used for the injection a mixture of what was left in two tubes of the "606," the rest of the contents of the vials having been used in another case respectively fourteen and three days previously. The tips of the tubes were fused again to protect the remaining contents, and he thinks that the heat applied in the fusing must have modified the drug within in some way to render it more toxic. Experiments on animals with the "606" after it had been heated seemed to confirm this assumption of a toxic modification of the drug under the influence of heat.

109. **Drug Hyperkeratosis.**—In the first of Ruete's two cases, a man had taken 18 drops of Fowler's solution every day for two years; it had been prescribed originally for herpes and he had not seen a physician since. During the last year keratosis in both hands and feet had developed to a pronounced degree, the palms being covered with wart-like excrescences. The patient was otherwise in good health and free from nervous disturbances. On suspension of the arsenic the skin affection subsided, but it showed a tendency to recur if he took arsenic in any form. There was no melanosis. In the second case the hyperkeratosis was evidently of syphilitic origin and was accompanied by ichthyosis of the back, all subsiding under mercurial treatment.

Virchows Archiv, Berlin

November, CCII, No. 2, pp. 161-329

111 Lipoid Pigment of Nerve Cells. (Ist das Nervenpigment ein Abnutzungsprodukt der Zelle?) M. Mühlmann.
112 Amyloidosis of the Heart. V. Hecht.
113 Chromaffine Substance of the Suprarenals with Kidney Disease. (Nebennieren von Tieren und Menschen bei Nierenkrankheiten.) W. Nowicki.
114 Obliterating Tuberculous Mastitis. A. Ingier.
115 Pseudoleukemia and Tuberculosis. A. Lichtenstein.
116 Absorption in the Human Great Omentum. S. Suzuki.
117 Cystic Kidney in the Domestic Animals. (Sackniere, perinephritische und intranephritische, subkapsuläre Zysten bei den Haustieren.) F. W. Hagemann.
118 Histology of Hydronephrotic Contracted Kidney. J. Orth.
119 Spontaneous Rupture of the Bladder. (Fall von spontaner Blasenruptur mit Veränderungen der elastischen Substans im Rupturrande des Peritonäums.) T. Frieberg.
120 Teratoma in Anterior Mediastinum. F. Sieber.
121 Dissecting Aneurism of the Aorta. G. Moriani.
122 Chronic Rigid Spine. (Chronische Wirbelsäulenversteifung.) G. Wehrlig.
123 Abnormally Large Parietal Foramens. L. Plenk.

Wiener klinische Wochenschrift, Vienna

November 10, XXIII, No. 45, pp. 1583-1632

124 *Defective Development of Testicles. (Entwicklungsstörungen der männlichen Keimdrüsen im Jugendalter.) J. Kyrle.
125 *Transmission of Cretinism from Man to Animals. (Uebertragung des Kretinismus vom Menschen auf das Tier.) A. Kutschera.
126 Ehrlich's "606" in Syphilis. G. Riehl.
127 Idem. O. Kren.
128 Prostatectomy for Traumatic Hemorrhage. H. v. Haberer.

124. **Disturbances in the Development of the Testicles in Children.**—Kyrle found only ten apparently normal testicles in 110 child cadavers. In eighty-six cases development was extremely defective. Among thirty-nine children less than a year old, in twenty-nine the testicles showed this striking lack of normal development, showing that it was congenital. In fifty of the cadavers there were other anomalies in development. It is evident, he says, that a child born with undeveloped, unfinished testicles must be on a lower physical plane than the children with normal genital glands, according to the modern conception of the great importance of these glands for the development of the organism as a whole. He describes the histologic findings in detail, with eleven illustrations, this being, he thinks, the first research of the kind on the testicles before puberty.

125. **Transmission of Cretinism to Animals.**—Kutschera found two dogs with every sign of cretinism, including the enlarged thyroid, which were brought up in the bed with a certain pauper and her cretin children. Another dog given the family and sleeping in the same bed developed signs of cretinism in three months, and in nine months the picture of cretinism was complete. Another normal dog given the family at the same time was too large to be taken into bed

with them, and he escaped the cretinism, although he slept in the room. Kutschera states that practical experience has confirmed again and again the theoretical premises that cretinism is most liable to develop in small, dirty homes among people who are lacking in a sense for cleanliness and who were exposed to frequent or intimate contact with cretins in early childhood.

Zeitschrift für Urologie, Berlin

November, IV, No. 11, pp. 809-896

129 Deformed Penis. (Zwei seltene Missbildungen der männlichen Genitale.) F. Neumann.
130 Congenital Stenosis of Male Urethra. K. R. Wilckens.
131 *Sarcoma of the Bladder. (Zur Statistik und Kasuistik der Blasensarkome.) C. Munwes.

131. **Sarcoma of the Bladder.**—Munwes traces the history of these lesions from 1639 to date, and states that an operation was undertaken in 76 of the 107 cases on record. In 14 no operation was attempted and no mention was made of the treatment in the others. The growth was a round-celled sarcoma in 30 and a spindle-celled sarcoma in 16 of the 94 cases in which the structure is mentioned, and the others were in 12 different categories. The interval between the first symptoms and the operation was from 3 to 16 years in 15 cases, and from 6 weeks to 2 years in 40 others; the data on this point are not given in the other cases. Among the 69 operative cases there have been only 3 patients permanently cured; that is 4.3 per cent. free from recurrence for 5 and 13 years to date; 15 patients succumbed to recurrence. Two of the permanently cured patients had the growth removed by mere resection of the bladder wall. In a personal case described, the patient was a woman of 77, and the alveolar sarcoma was inoperable.

Zentralblatt für Gynäkologie, Leipsic

November 12, XXXIV, No. 46, pp. 1481-1520

132 *Prophylaxis of Air Embolism with Placenta Prævia. H. Peters.

132. **Avoidance of Air Embolism with Placenta Prævia.**—Peters is convinced that fatal air embolism is more common than generally believed, especially in private practice with lack of necropsy. But about a dozen cases of air embolism with placenta prævia are now on record. He had a case of this kind in his own practice, the fatal embolism occurring as he was seizing the foot after version, without anesthesia, on an otherwise healthy woman with wide vagina and non-ruptured membranes. No means is known to avoid this danger of air embolism unless the version and separation of the placenta can be done *under water*. He thinks that this innovation might ward off all danger from this cause, but he has had no opportunity to apply it himself. He suggests that the bath tub could be cleaned with boiling water and alcohol, setting fire to the alcohol, and using boiled water for the bath; no more water is needed than to cover properly the external genitals. The inflatable bag could be introduced under water, and the vaginal portion of the uterus could be drawn out of the vulva, which maneuver aids materially in manual separation of the placenta, but has not been applicable hitherto with placenta prævia on account of the danger of air embolism.

Gazzetta degli Ospedali e delle Cliniche, Milan

November 3, XXXI, No. 132, pp. 1393-1400

133 *Nutrient Subcutaneous Injections. (Dell'alimentazione sostitutiva per via ipodermica.) V. d'Amico.

November 6, No. 133, pp. 1401-1416

134 Lymphogranuloma. G. Serafini.

November 8, No. 134, pp. 1417-1424

135 Suggestion for Experimental Research on Spermatozoa as Possible Causal Agents of Cancer. (Nuovo studio sperimentale sull'origine del tumori.) P. Melloni.

133. **Subcutaneous Nutrient Injections.**—D'Amico states that the experiences to date show that subcutaneous nutrient injections are the only rational and effective means for supplying nourishment, except by the natural route. He thinks that the only absolutely efficient substance for the purpose is fresh, fertilized yolk of egg. This contains the substances required, and in the proper combination. He adds to the yolk 5 gm. of 1 per cent. iodized glycerin and 5 gm. of physiologic salt solution. The mixture is injected into the buttocks; the glycerin has a special urolytic action while the salt solution favors the assimilation of the mass and the iodin stimulates phagocytosis and cell functioning. His experiences have been uniformly favorable with this technic during the four years in which he has been applying it. The local swelling rapidly subsides. Symptoms of uricemia were observed in only a few cases, including that of a child with tuberculous lesions; there seems to be an excess of uric acid in the blood in the tuberculous. In case it is necessary to supply fluids without demands on the alimentary canal, he has found diluted Trunecek's serum best adapted for the purpose. This contains the salts normally in the blood, the formula being sodium sulphate 0.44, gm.; sodium chlorid, 4.92; sodium phosphate, 0.15; sodium carbonate, 0.21; potassium sulphate, 0.4, and distilled water to 1,000 gm. In a hundred cases of uncontrollable vomiting, this technic of injection of the yolk of eggs, supplemented by 1,000 gm. of the Trunecek serum, the latter repeated as needed, has often been followed by actual resurrection in the most desperate cases. Even when the patients were apparently moribund, in some cases, life was prolonged for from five days to two months.

Riforma Medica, Naples

October 31, XXV, No. 44, pp. 1205-1229

136 Treatment of Gastric Disease. (Terapia delle gastropatie dinamiche, ipersecretive ed ipercriniche. IX.) G. Rummo.
137 The v. Pirquet Tuberculin Reaction. (Cutireazione del Pirquet.) L. Mazzetti.

Norsk Magasin for Lægevidenskaben, Christiania

November, LXXI, No. 11, pp. 1153-1266

138 *Radium Emanations and Endemic Goiter. (Det endemiske strumas aetiologi.) B. Ebbell.
139 Gangrenous Ecthyma. K. Grøn.
140 *Tuberculosis of the Kidneys. (Tuberculosis renum.) C. Johannessen.
141 Operative Treatment of Glaucoma. (Iridotasis antiglaucomatosa.) J. Borthen.
142 Histologic Study of the Heart Musculature. S. Widerøe.
143 Digitalis and Camphor in Croupous Pneumonia. N. A. Quiling.

138. **Etiology of Endemic Goiter.**—Ebbell calls attention to the fact that goiter seems to be endemic in the regions and the geologic formations where there seems to be the greatest radio-activity. This has convinced him that the radium emanations may be responsible for development of endemic goiter, this assumption being sustained by the fact that boiling the water, which annuls its radio-activity, seems to prevent the tendency to development of goiter. He has no opportunity for experimental research in this line and he asks others to give animals radio-active water exclusively for a period of three months at least to determine the effect on their thyroids.

140. **Tuberculosis of the Kidney.**—Johannessen accepts the possibility of spontaneous recovery from tuberculosis of the kidney—several such cases are on record, but the rarity of this occurrence does not permit reliance on it. He gives the details of a number of instructive cases. The subjective and objective symptoms may vary within a wide range and the tuberculous process in the kidney may run an entirely latent course for a long period, without any subjective or objective symptoms. This explains why tuberculous nephritis often is not diagnosed until it has reached a comparatively advanced stage. In other cases pains and hematuria bring the patient to the physician in an early stage. In some cases the first symptoms are pollakiuria with frequent micturition or even incontinence. Guiay noted pollakiuria as the only symptom of incipient kidney tuberculosis in six out of thirty-one cases; in three cases nocturnal incontinence of urine was the first sign of trouble. This may be the result of what Guyon calls reno-cystic reflex action. The kidney is generally enlarged, but may sometimes be abnormally small; in the beginning the kidney is not palpable as a rule. In the incipient stage there may be a dull or vague pain of varying intensity and apparently spontaneous, localized in one of the lumbar regions, sometimes the sound side, or paroxysmal severe pain, radiating down to the bladder or to the other kidney or up into the shoulder. The urine may be limpid and acid without albumin. In one of the cases reported the urine was pathologic but the bladder seemed entirely normal. In another the severe pains were localized in the left side while the right

was the diseased kidney. In another case the pains developed suddenly in the night, radiating to the bladder and urethra and accompanied with vomiting and chills. This pseudocolic recurred three or four times in two or three months, the patient having no pain in the intervals. One patient was a young man, apparently healthy until he noticed pollakiuria for two months, and then the pseudocolic above mentioned. Now, five months after nephrectomy, he seems in the best of health. In the case of a woman of 28 a similar sudden nocturnal pseudocolic was the very first sign of trouble.

Ugeskrift for Læger, Copenhagen

November 3, LXXII, No. 44, pp. 1333-1364

144 Radium Emanations in Uricacidemia. H. Jansen.

Books Received

Books received are acknowledged in this column and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

MODERN TREATMENT. The Management of Disease with Medicinal and Non-Medicinal Remedies. In Contributions by American and Foreign Authorities. Edited by Hobart Amory Hare, M.D., Professor of Therapeutics and Materia Medica, Jefferson Medical College, Philadelphia. Assisted by H. R. M. Landis, M.D., Director of the Clinical Department of the Phipps Institute (University of Pennsylvania). In Two Volumes. Vol. I. Cloth. Price, $6 net. Pp. 980, with 105 illustrations. Philadelphia: Lea & Febiger, 1910.

DIE FRANKENKOST. Ein praktisches Handbuch für Aerste, Kranken- und Wohlthätigkeitsanstalten, Sanatorien, Pflegepersonen, Erziehungsanstalten und für die Familie. Von Emilie Kleinhans, Wien. Verfasserin mehrerer, zum Teil preisgekrönter Kochbücher, und Dr. Karl Wirth, Wien, ehem. Assistant d. Wiener allg. Krankenhauses. Paper. Price, 3.60 marks. Pp. 250. Munich: J. F. Lehmanns Verlag, 1910.

THEORIE UND PRAXIS DER INNEREN MEDIZIN. Ein Lehrbuch für Studierende und Aerzte. Von Dr. Erich Kaufmann in Bonn. Erster Band. Die Krankheiten der Zirkulations- und Respirationsorgane. Cloth. Price, 7 marks. Pp. 604, with 47 illustrations. Berlin: S. Karger, 1911.

CIVICS AND HEALTH. By William H. Allen, Secretary, Bureau of Municipal Research. With an Introduction by William T. Sedgwick, Professor of Biology in the Massachusetts Institute of Technology. Cloth. Price, $1.25. Pp. 411, with illustrations. Chicago: Ginn & Co., 1910.

FEVER-NURSING. Designed for the use of Professional and other Nurses, and especially as a Text-Book for Nurses in Training. By J. C. Wilson, M.D., Author of "A Treatise on the Continued Fevers." Cloth. Price, $1 net. Pp. 248. Philadelphia: J. B. Lippincott & Co., 1910.

DIE WASSERMANN'SCHE REAKTION. Mit besonderer Berücksichtigung ihrer klinischen Verwertbarkeit. Von Dr. Harald Boas, Privatdozent an der Universität. Mit einem Vorwort von Prof. A. Wassermann. Paper. Price, 5.60 marks. Pp. 186. Berlin: S. Karger, 1911.

DIAGNOSTIK DER NERVENKRANKHEITEN. Von Dr. L. R. Bregman, Oberarzt am städtischen Jüdischen Krankenhause in Warschau. Mit einem Geleitwort von Dr. H. Oberstein in Wien. Paper. Price, 12 marks. Pp. 535, with 198 illustrations. Berlin: S. Karger, 1911.

A GUIDE TO READING IN SOCIAL ETHICS AND ALLIED SUBJECTS. Lists of Books and Articles Selected and Described for the Use of General Readers. By Teachers in Harvard University. Boards. Price, $1.25. Pp. 265. Cambridge: Harvard University, 1910.

DISEASE OF THE PANCREAS. Its Cause and Nature. By Eugene L. Opie, Professor of Pathology, Washington University, St. Louis. Second Edition. Cloth. Price, $3. Pp. 387, with 47 illustrations. Philadelphia: J. B. Lippincott Co., 1910.

THE NEED OF REVISING MORALS AND LAWS. A Lecture Delivered at the Royal Albert Hall, London, May 6, 1910. By Lady Cook (née Tennessee Claflin). Paper. Price, 1 penny. Pp. 19. London: Hayman, Christy & Lilly, 1910.

NEW JERSEY TRAINING SCHOOL FOR FEEBLE-MINDED GIRLS AND BOYS, Vineland, Cumberland County, 1910. Twenty-Second Annual Report. Paper. Pp. 103, with illustrations. E. R. Johnstone, Supt., Vineland, N. J.

HOW TO COOK FOR THE SICK AND CONVALESCENT. Arranged for the Physician, Trained Nurse and Home Use. By Helena V. Sachse. Fourth Edition. Cloth. Price, $1.25 net. Pp. 337. Philadelphia: J. B. Lippincott, 1910.

FORTIETH ANNUAL REPORT OF THE CENTRAL STATE HOSPITAL OF VIRGINIA (PETERSBURG). For the Fiscal Year Ending September 30, 1910. Paper. Pp. 95, with illustrations. William Francis Drewry, M.D., Superintendent.

THE MODERN VIEW OF SYPHILIS AND ITS TREATMENT. By Gustav Baar, M.D., Member German Congress for Internal Medicine. Cloth. Price, $2 net. Pp. 385. New York: D. Appleton & Co., 1910.

THE THIRD ANNUAL REPORT OF THE COMMISSIONER OF HEALTH OF THE COMMONWEALTH OF PENNSYLVANIA. 1909. Cloth. Pp. 1239. Samuel G. Dixon, Commissioner of Health, Harrisburg, Pa.

THE PHYSICIAN'S VISITING LIST (LINDSAY & BLAKISTON'S) FOR 1911. Leather. Price, $1.25. Twenty-five patients per week. Philadelphia: P. Blakiston's Son & Co., 1910.

New Patents

Recent patents of interest to physicians:

961840. Vegetable hair tonic. John G. Burgess, San Diego, Cal.
962004. Indicating bottle. William T. Cassidy, Chicago.
962313. Vaginal irrigating syringe. Henry W. Champlin, Walters Park, Pa.
962316. Can-cap dropper. Elmer M. Cobb, Portland, Maine.
961936. Machine for making capsules. Arthur Colton and B. W. Scott, Detroit.
961760. Making alkali thiosulfates. Louis Destree, Haren, Belgium.
961848. Machine for granulating magnesia. Ubaldo Di Marco, Hawthorne, N. J.
961945. Manufacture of bicarbonate of soda. R. H. F. Finlay, Belfast, Ireland.
962218. Aseptic needle-thread holder for surgical use. Maurice G. Helts-Boyer, Paris, France.
962380. Surgical attachment for cots or beds. Eddie E. McMahon, Denver.
962103. Making pure ortho and para-guaiacol sulfonic salts. Bruno E. Seifert and H. Hable, Radebeul (near Dresden), Germany.
962170. Making silicon nitrid. Alf Sinding-Larsen, Christiana, Norway.
962067. Receptacle having apparatus for projecting disinfecting materials, etc., into it. Charles Waldstein, Cambridge, England.
962809. Sterilizer. Sophia Blickman, New York.
962817. Inhaler. Ignazio Bucceri, Brooklyn.
962999. Portable fountain syringe. Artemas L. Dawson, Devall Bluff, Ark.
962753. Making a neutral sodium salt of lactalbumin. Ernst Fischer and P. Bergell, Berlin, Germany.
962952. Extension obstetrical instrument. Leonard Gougora, Waco, Texas.
962901. Massage apparatus. Henry C. Karpenstein, New York.
962657. Syringe. Patrick J. McElroy, Cambridge, Mass.
962790. Scleroscope. Albert F. Shore, New York.
962505. Hanging receptacle for medicines and the like. Johnny B. Smith, Johannesburg, Transvaal.
962872. Soluble perfume tablet. Russell W. Whitlatch, Brooklyn.
963529. Water purifier. Frederick Dinghaus, Puerto Barrios, Guatemala.
963538. Invalid-bed. John B. Ford, Jeffersontown, Ky.
963051. Ointment applier. Robert A. Kooken, Fort Worth, Texas.
963454. Sputum-cup and holder therefor. Christian W. Meinecke, Jersey City, N. J.
963244. Sterilizing milk. Casslus C. Palmer, Cranford, N. J.
963469. Truss. Charles Pence, Galena, Kan.
963174. Making concentrated sulfuric acid. Otto Proelss, Kansas City, Mo.
963175. Making sulfuric acid. Otto Proelss, Kansas City, Mo.
963179. Pocket atomizer. Royal F. Richards, Los Angeles.
963254. Phenol sulfonate of opium alkaloids. George L. Schaefer, Brooklyn.
963726. Combined steriliser and water-heater. Elbridge G. Stamper, Paducah, Ky.
963482. Vaginal syringe. Ida L. Stevens, St. Louis.
963664. Sanitary cuspidor. Michael F. Troy, Brooklyn.
963492. Disinfector and deodoriser. Joseph, W. H. and H R. Williams, Sharpsburg, Pa.
964406. Packing for metal canulas, or the like. Carl F. Dewitt, Berlin, Germany.
964156. Making haloids. James C. Graves, Midland, Mich., and J. F. Simons, Cleveland.
963890. Jury and jury-frame for orthopedic treatment. Gustave W. Haas, Los Angeles.
964105. Adjustable bed. Daniel Hogan, Hoboken, and C. W. Meinecke, Jersey City, N. J.
964267. Sanitary napkin, and belt for supporting the same. James H. Johnson, Washington, D. C.
963809. Surgical clamp. Samuel L. Kistler, Los Angeles.
964110. Mouth speculum. John F. Koehler, Sawyer, Mich.
964170. Physician's table. Charles N. Leonard, Indianapolis.
963798. Artificial foot and ankle joint. E. Mueller, Reserve Township, Pa.
963797. Artificial limb. E. Mueller, Reserve Township, Pa.
963933. Eye-cup. William J. O'Neill, Chicago.
964309. Obstetrical appliance. Jennie D. Parrott, Washington, D. C.
964312. Vibrator. Carl A. Pfanstiehl, Highland Park, Ill.
964730. Faucet syringe. Charles F. Ackerman, Cleveland.
964950. Hypodermic syringe. Albert A. Allinger, New York.
964838. Sterilizing hopper. Arthur C. Badger, Newton Center, Mass.
964898. Movement cure apparatus. Theodor Budingen, Constance, Germany.
965079. Mouth-speculum. Henry E. Caswell, Jeffersonville, Ohio.
964492. Oxygen-generator. Monroe S. Clawson, New York.
964760. Syringe. James H. L. Eager, New York.
964903. Syringe. John L. Fisher, Providence, R. I.
964964. Indurated casein compound. Byron B. Goldsmith, New York.
965137. Indurated albuminoid compound. Byron B. Goldsmith, New York.
964777. Pasteurising apparatus. James W. Heiser, Wheeling, W. Va.
964779. Bath cabinet. Adolph M. Holaday, Walthena, Kan.
964550. Disinfecting apparatus. William H. Rose, New York.